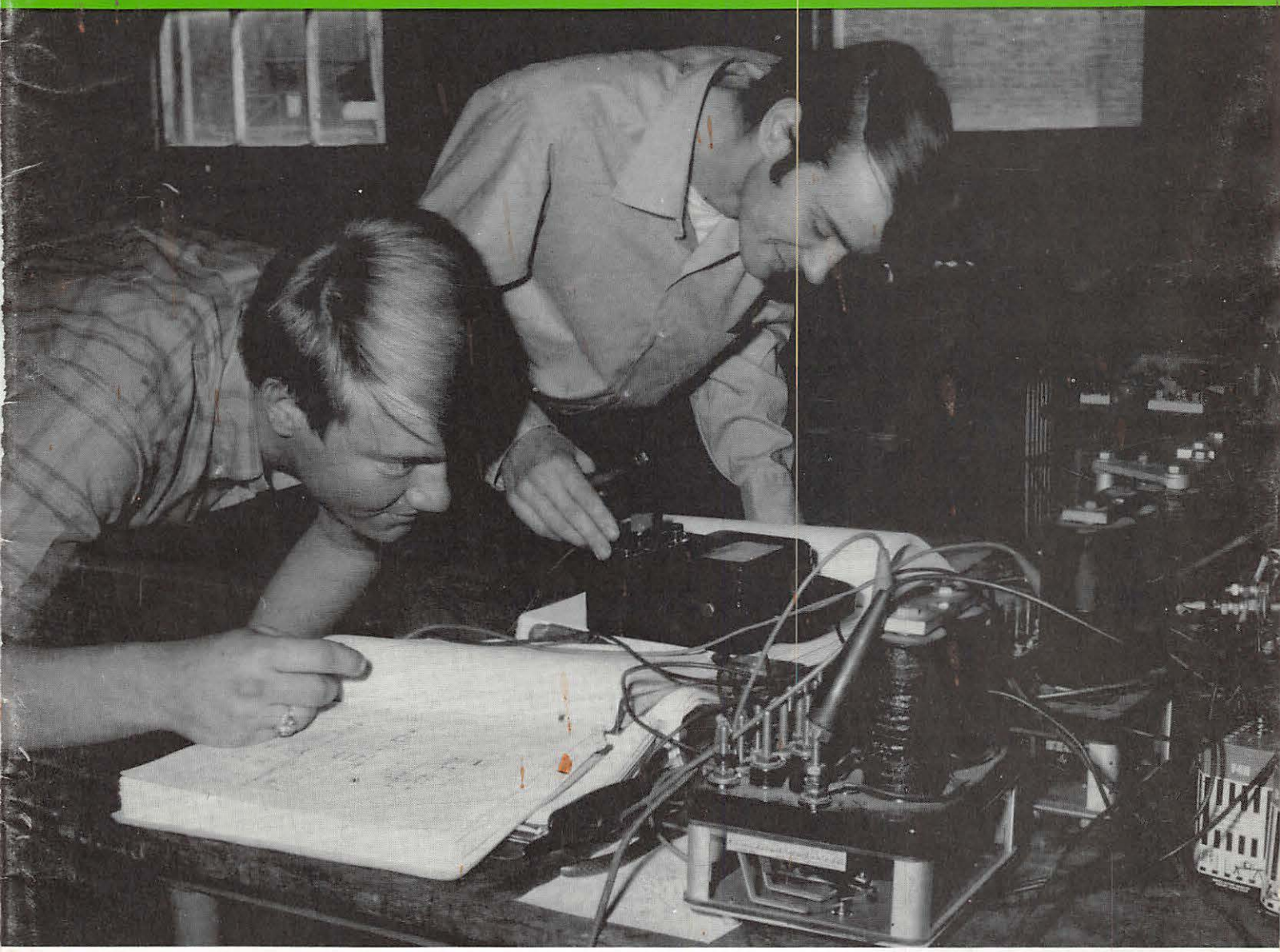
April 1974

THE SIGNALMAN'S JOURNAL



Railroads and suppliers provide signal training . . . .

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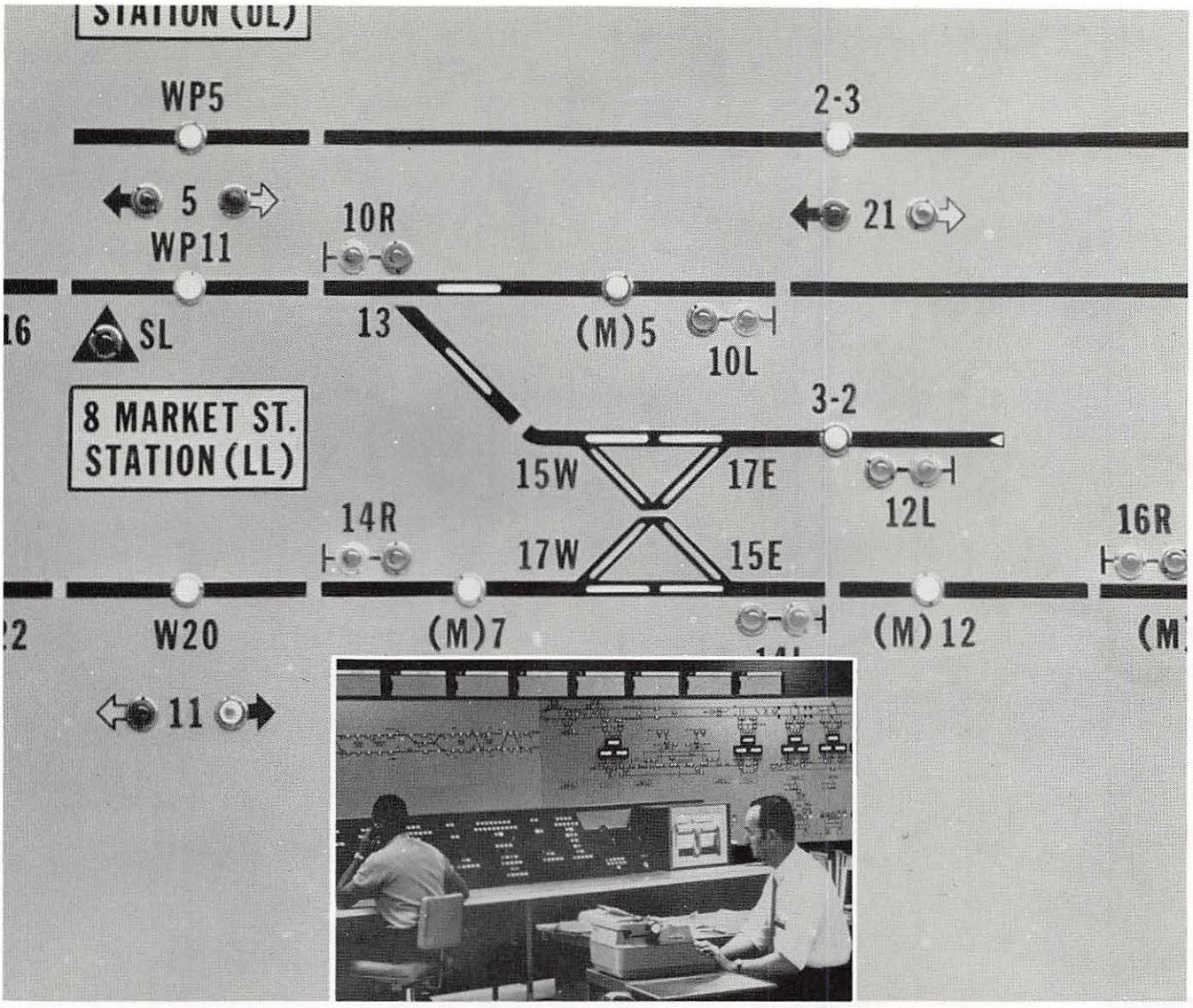

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THE
SIGNALMAN'S JOURNAL

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Cover: **Allan Vonnahme** (left) and **Tom A. Lucas,** both members of Milwaukee Road BofRS local 219 work with a circuit exercise from a text at the signal training school in Milwaukee, WI.

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GRAND LODGE DIRECTORY

C. J. CHAMBERLAIN, *President*
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4243 Forest Avenue
Paducah, KY 42001
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601 W. Golf Road
Mount Prospect, IL 60056
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Room 508, Crescent Bldg.
1411 Crescent Street
Montreal 107, PQ, Canada
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400 First St., N.W.
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Director of Research

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Mount Prospect, IL 60056
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Winnipeg R3T 2G6,
MB, Canada
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601 W. Golf Road
Mount Prospect, IL 60056

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Chamberlain's Message

Signal system moratorium needed

Our primary purpose in requesting a moratorium on signal system removals in total or in part is that the increased rail traffic generated by the energy crisis would put an additional traffic and safety burden on the railroads. We requested Department of Transportation Secretary Claude Brinegar to apply the moratorium not only to railroads in the Northeast, but in the entire United States. In responding to our moratorium request Secretary Brinegar has suggested that we present our case at an upcoming hearing in regard to a Baltimore & Ohio request to remove automatic block signaling on some 90 miles of line of the old BR&P between Brookdale and Ashford, NY—the line to Rochester from Salamanca.

While we will present evidence at this hearing to support our request there are many other factors that should be considered aside from the desire of one road to remove signaling on one line. It is quite apparent that Secretary Brinegar has for some reason or other refused to recognize that our request was designed to halt the further deterioration of railroads and their signal systems in the interest of our national welfare and transportation needs. Is it a coincidence that the DOT report on rail service in the Midwest and Northeast Region recommends that this B&O line be abandoned?

One of our main points is that signaling is needed as never before to provide safety of movement of increasing traffic and to provide increased capacity. In the first two months of 1974 revenue ton-miles of United States railroads increased 3% over 1973. And last year as a whole registered a ton-mile increase of 9% over 1972. Traffic growth is increasing and the railroads just do not have the excess capacity to handle much more of an increase.

Robert W. Downing, vice-chairman and chief operating officer, Burlington Northern Inc., said, "With all of the publicity about the troubles of the Eastern railroads and discussion of unused branch line trackage, the idea seems widespread that the railroads have much excess capacity. But in many parts of the country this is just not true. On BN and on many other roads, we need many millions of dollars to upgrade tracks, bridges and yards just to meet demands of today's growing traffic and more especially to prepare for the new business which will be available if we can handle it."

It is significant to note that most of the recommendations made by DOT in its Midwest and Northeast report are based upon 1972 traffic volumes, before the energy crisis. Certainly a re-appraisal is necessary and appropriate before any action can be taken based on such outdated figures.

The report does correctly recognize that the installation of centralized traffic control can increase the capacity of a single-track line by 50%—from 40 to 60 trains daily and gross tons per year from 62 million to 93 million. For double track the increase is not quite as great—120 trains per day under abs to 160 per day under ctc; and gross tons per year from 186 million to 250 million.

In the face of increasing traffic, it is readily evident that signaling is a major solution to providing the capacity required. From an economic standpoint, signaling makes even more sense as a means to increase track capacity and safety at the same time.

One interesting note about today's changing traffic patterns, we read recently about light traffic lines now being subjected to unit coal and unit grain trains. Operations with trains of upward of 5,000 tons which can really tear up the track and roadbed are increasing and light traffic lines that never before had enough traffic to warrant signaling will need it.

It is time for more signaling, not less. It is time that the Federal Railroad Administration recognize that the interests of our country require an improved network of railroad systems.

Increased rail freight traffic and the tremendous increase in ridership on Amtrak, commuter lines and mass transit in recent months demand that we start improving and rebuilding our present systems.

The railroad industry has no way to go but up and in our national interest it is absolutely essential that all of us in the railroad industry, labor, management, and the governmental agencies having jurisdiction over the industry, coordinate our efforts to make it the most reliable, safest form of mass transportation in the world.

Removal of signal systems and track abandonments is not a step in the right direction and we, along with other railroad labor unions, will use all of our resources and expertise to prevent further deterioration of our railroad plant.

Secretary Brinegar, please note.

Harper died March 30

It is with considerable sadness we report that Brother G. F. Harper, BofRS, vice-president died March 30 following a long illness, in Northwest Community Hospital in Arlington Heights, IL. Our deepest sympathy is extended to his family. A memorial article covering his career and many contributions to the Brotherhood of Railroad Signalmen will be published in next month's issue.

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News

C&S Sectional meetings coming April-May

Three sectional meetings of the Communication & Signal Section, AAR, will be held in St. Louis, MO, Montreal, QUE, and Louisville, KY during April and May.

Western Sectional meeting will be held Wednesday, April 17 at the Downtown Holiday Inn in St. Louis. Chairman is M. C. Fulks, principal assistant signal engineer, Southern Pacific, and Committee of Direction sponsor is J. S. Downs, general superintendent communications and signals, St. Louis-San Francisco.

Northern Sectional meeting will be held Tuesday, April 30 at the Queen Elizabeth hotel in Montreal, QUE. D. H. Walkington, assistant engineer of signals, CP Rail, is chairman. D. H. Green, manager signal systems, Canadian National, is CofD sponsor.

Eastern Sectional meeting will be held at the Galt House in Louisville on Thursday, May 16. Chairman is D. L. Webb, signal engineer-planning and design, Louisville, & Nashville. CofD sponsor is J. P. Powell, superintendent of signals, L&N.

ACI Manufacturer may be bought by Pullman

Computer Identics Corp., automatic car identification equipment manufacturer may become a part of Pullman, Inc. The diversified transportation equipment maker—trailers and freight cars—said it agreed in principle to acquire CI, for an undisclosed amount of stock. Also involved would be ACI Systems Corp., a CI subsidiary that markets, installs and services aci equipment and systems.

Boston awards GRS $5.7 million contract

General Railway Signal has received contracts totalling over $5,788,000 from the Massachusetts Bay Transportation Authority to furnish and install equipment to improve and expand Boston's automatic train control and signaling facilities.

The order includes equipment to modify and expand the existing interlocking at Columbia Junction, additions and modifications to the high frequency wayside train control system at Columbia Junction, and to the System 4000 code system at Central, Washington, and Columbia and at the Dewey control office.

Six new panels and four revised panels will be installed at the Dewey center, as well as equipment to modify the relay racks and to provide for extending the controls over an approach line to the South Bay Maintenance Center as far as Boston street.

The order also includes 51 Model 5F dual control electric switch machines to be installed at the South Bay Maintenance Center.

Negotiations continue on railroad pensions

Long hours and hard work are the order of the day for the 14 representatives of the railway brotherhoods and railroad management meeting, since last July on making the Railroad Retirement System actuarily sound. A proposal must be submitted to Congress by April 1, under Public Law 93-69. This was the law that set up the plan whereby operation of the Railroad Retirement System is handled by the Social Security Administration. The main problem is that payments under RR Retirement are ahead of income into the fund by about 9%. Predictions of the bankruptcy date range from 1980 to 1985. How to revise the system to prevent bankruptcy is the effort now underway by union and management representatives.

Leading the way in active negotiations are C. J. Chamberlain, president, Brotherhood of Railroad Signalmen, and chairman, Railway Labor Executives' Association; and A. H. Chesser, president, United Transportation Union, and chairman, Congress of Railway Unions. William Dempsey, chairman, National Railway Labor Conference, heads the management negotiating team.

The railroad brotherhoods have hired Robert J. Myers, former chief actuary for the Social Security Administration, and now professor of actuarial science at Temple University, as a special consultant for this project.

Under the law setting up this pension change for railway men, management and the brotherhoods must come up with a joint proposal by April 1. If they fail, Congress will probably take action this year with legislation to solve the financial crunch, which many observers feel will be some type of subsidy. However, Congress may provide for imposed conditions that could displease both labor and management. Hence, there is an urgency for the negotiating groups to come up with a joint proposal for Congress. "Hard bargaining" has been going on during the last two weeks in March, and opinions are that if the brotherhood-management teams are close enough to a solution by April 1, they could receive an extension of time to work out the details.

Edison acquires electronics firm

Edison Battery Division, McGraw-Edison Co. has acquired General Sytems, Inc., of Erie, PA., a manufacturer of solid-state electronic products including constant potential, automatic battery chargers. Robert J. Doyle, manager of sales engineering, at Bloomfield, NJ, appointed plant manager, the Electronics Plant, at Erie. His successor is Peter C. Bradshaw, formerly field engineer at Bloomfield.

Since 1963, the Edison Battery Division has been exclusive distributors for General Systems equipment. The manufacturing plant will remain in Erie, Pa. but will be moved to a new location of 6410 West Ridge Road. It will be known as the Electronics Plant of the Edison Battery Division and will be operated under the management of—and as a part of—that division. All products previously manufactured under the "General Systems" name will be manufactured and marketed under the "Edison" name.

BN orders signal units for ctc in Illinois

Burlington Northern ordered signal equipment from Union Switch & Signal Division, WABCO, to install centralized traffic controls from Galesburg to Barstow, IL, 43 miles. Equipment includes instrument housings, electric switch machines, searchlight signals and type 514 relay code system. Control will be from a section added to an existing dispatcher's control machine at Cicero, IL.

RS&I

Inspections & Tests

Sec. 236.102 Signal mechanism.
Signal mechanism shall be inspected at least once every six months, and tests of the operating characteristics of all parts shall be made at least once every two years.

Sec. 236.103 Switch circuit controller.
Switch circuit controller shall be inspected and tested at least once every three months.

Sec. 236.104 Shunt fouling circuit.
Shunt fouling circuit shall be inspected and tested at least once every three months.

Sec. 236.105 Electric lock.
Electric lock, except forced-drop type, shall be tested once every two years.

Sec. 236.106 Relays.
Relay in service, except locomotive relay, shall be tested at least once every two years.

Sec. 236.107 Lightning arresters.
Gas and vacuum type lightning arresters shall be tested at least once a year.

Sec. 236.108 Insulation resistance tests.
Insulation resistance tests shall be made when wires, cables, and insulation are dry. Wires and cables, except wires connected directly to track rails, shall be tested in accordance with the following schedule. Conductors shall be promptly repaired or renewed when insulation resistance is below the following values:

Description	Period	Minimum allowable resistance
Low voltage (660 volts or less) wires and cables with insulation and protective outer covering not specifically designed for underground use, any part of which is underground or in trunking.	5 years	1 megohm
Low voltage (660 volts or less) wires and cables with insulation and protective outer covering not specifically designed for underground use, no part of which is underground or in trunking.	8 years	Do
Low voltage (660 volts or less) wires and cables with insulation and protective outer covering designed specifically for underground use, or in underground conduit, or as submarine cables.	8 years	Do
Local signal wiring.	do	Do
Lead covered signal power cable.	do	100 megohms between sectionalizing switches
Underground signal power lines not lead sheathed.	5 years	40 megohms for voltages up to and including 660 volts for section tested 100 megohms between sectionalizing switches for voltages exceeding 600

Sec. 236.109 Records of results of tests; forms for keeping records; where filed.
Results of tests made in compliance with Sec. 236.102 to 236.108 inclusive, 236.376 to 236.387, inclusive, and Sec. 236.576, 236.577, 236.586, 236.588, and 236.589 shall be recorded on forms provided by the railroad. Such forms shall show name of railroad, place and date, equipment tested, repairs, replacements, adjustments made, and condition in which apparatus was left, and signature of employee making the test. Each form shall be filed in the office of a divisional officer of the division on which the tests were made.

Inspection & Tests

Sec. 236.376 Mechanical locking.
Mechanical locking in interlocking machine shall be tested when new locking is placed in service or change in locking is made. Complete test shall be made at least once every 4 years.

Sec. 236.377 Approach locking.
Approach locking shall be tested at least once a year.

Sec. 236.378 Time locking.
Time locking shall be tested at least once a year.

Sec. 236.379 Route locking.
Route or other type of switch locking shall be tested at least once every three months.

Sec. 236.380 Indication locking.
Indication locking for semaphore signals and for switch or lock levers shall be tested at least once a year and for light signals at least once every two years.

Sec. 236.381 Traffic locking.
Traffic locking shall be tested at least once a year.

Sec. 236.382 Switch obstruction test.
Switch obstruction test shall be made at least once a month.

Sec. 236.383 Valve locks and valve magnets.
Valve locks on valves of the non-cut-off type, valves, and valve magnets shall be tested at least once every three months.

To Be Continued

Railroads and suppliers provide

Ronald J. Marko (left) of Local 220 and **Gary T. Schaning** of BofRS Local 61 work with M-23B switch machine at MILW signal training school.

CN uses slides

Glenn Robertson, training development officer, Canadian National, described his road's efforts at producing sound, colored slide training programs. Basic equipment that cost less than $600 included an Anscorama stop-action slide projector, Samuel stereo tape recorder and Pentax 35 mm camera. He said it was a big advantage to take your own pictures because you are able to get the exact scenes and sequences that you desire to describe a device or system. One big advantage of the slide projection method is that it allows the instructor to set his own time for viewing each slide, and he can back up if he so desires. At the workshop, Robertson showed a 23 minute slide program that CN developed on the oil-fired, air blower type snow melter manufactured by Vapor Corp.

Training for signalmen was the topic of presentations at a Communication & Signal Section, AAR, workshop session last fall. Committee G—Education and Training, chairman J. J. Foster, chief signal, electrical and communications engineer, Reading, and three speakers discussed (1) AAR signal training bulletins; (2) manufacturers' training aids; (3) sound-slide films as training aids; and (4) one railroad's signal training program.

Foster mentioned that several signal training bulletins, prepared by members of Committee G, are now available. They are designed as brief—one or two pages—fact sheets on specific signal equipment and appliances.

Loren Sandstrom, staff engineer signals, Milwaukee Road, described his railroad's signal training program. An abstract of his talk follows.

Milwaukee Road has used correspondence courses for training, but as a supervisor in the field I was one of those that complained bitterly that new signalmen were not receiving proper training. We did something about it. Our management decided that we could no longer go with the status quo.

Our program was such that years ago we had an assistant signalman with a signalman in a crew and the assistant learned by osmosis. It was decided to take a serious look at what type of training was available at a basic level, in other words, at a level where the man could start at basic electricity. Also, instead of calling a circuit controller a black box, we actually would teach him what it was, its proper name and function. There is nothing more startling to find that many people call equipment black boxes—and think of it that way.

Our justification for a training program was evident from our turnover in manpower as regards retirements and resignations. Our needs for the next 5 years would be about 35 trained signalmen.

After reviewing existing signal training programs, we decided that the Canadian National's was beyond a doubt the best available. With their kind generosity they allowed us to use their course. Keeping their format, we changed only what was absolutely necessary in the way of Milwaukee Road circuitry, and things that weren't positively applicable in our standard procedures. Sections on automatic block signaling had to be revised, and of course, the text along with the circuitry. The ctc and interlocking chapters were practically rewritten but again around the initial format—the original type of presentation of Canadian National.

This was a great help in expediting our training program to get it off the ground. Our textbooks were printed by our own reproduction department. I would suggest that you do not overlook your facilities. Your people can do a fine job, and it can hold your costs down considerably. Also, it can give you a basis of updating and revising your books without too much trouble.

In the original CN course, the basic electricity section was based upon a U.S. Bureau of Navy Personnel basic electricity course that they reprinted. This course has been updated by Rider Books, and we purchased that book for our men. Our men are issued this book along with about a 4 volume set of the basic signal training texts.

The next step, as far as the Milwaukee Road was concerned, was to get a roof over our head and the physical plant. When the need is so apparent and you are faced with retirements everyday, you can't take too much time to pick a location to be built and wait for building to be constructed. We looked at existing facilities. We found a shop area that was being used for dead storage. With a little cleaning and equipping it with a blackboard, chairs, overhead projector, etc., we had a basic classroom.

As we began our signal training, we had very little in the way of laboratory or practical work materials other than the space available. But as the first classes were formed, we made it a class project to build a training aid or to provide the wiring, the power, etc., in the practical work sessions. Each class from, the first one to class six (the latest), has added to the training aids.

We are fortunate that our training classroom is located in Milwaukee, WI, the major shop area of our railroad. We are near both our signal shop and our signal material

signal training and aids

department. Much of the equipment is on loan from the material department. It is used for a particular instruction session, and then rechecked by our signal laboratory and put back on the shelf. They cooperate very nicely and it doesn't tie up a great amount of signal equipment. Other equipment has been constructed by our signal shop over and above that that was put together by our trainees in the practical work sessions.

Due to the size of our railroad, we stretch from Lousiville, KY to the Pacific Northwest, it was necessary to provide an auxiliary or second training location at Tacoma, WA. Basically we have a lines east and lines west regional situation. Due to the transportation costs etc., it was felt that we would be better off by training those people on lines west at Tacoma. And it has worked very well. It is not a permanent type training center. Before each class session, we collect what is necessary for that class, and make it available at the Tacoma training center. After use, any signal equipment is returned to the signal material department.

We started our signal training in October 1970. About the same time, we started discussions with the Brotherhood of Railroad Signalmen on an agreement to cover basic signal training. The agreement was completed June 15, 1971, shortly after we graduated the first class.

Our students are selected strictly from the assistant signalmen's roster and in seniority order, oldest man first. Initially we backed up to the top of the roster and took a few of the recently promoted signalmen, especially military returnees. Mostly we selected men who had a large amount of seniority, but really a short time of practical experience. The agreement states that the assistant will have approximately one year's service before coming to class, although due to requirements of class scheduling we fluctuate that somewhat. The men usually come to school with a range of service from about 6 months to about 18 months. We find that this original period over and above the 60 day probationary period, gives us and the man some idea as to whether he is going to fit into a signal career. Does he like it? Is he going to be interested? It gives us a chance to see some of the performance of the man, and also gives the man time to decide whether he's going to stay with the railroad.

Loren B. Sandstrom, (left) staff engineer signals, Milwaukee Road, shows **Leo T. Davies,** general chairman BofRS, Western-Cullen gate mechanism used at Milwaukee, WI signal training school.

Our class size has been as small as 6 and as large as 14. In a lecture type atmosphere where the first classroom sessions begin it is about 90% lecture and change so that at the end of the training period, it is about 90% practical, hands on-work. The lecture portion doesn't make too much difference whether the instructor talks to one person or to a room full. It has been established that about the best class size is about 8 to 10. In the practical application and laboratory work, we break down the class into 2-man groups. It makes it a little difficult for the instructor to cover everyone if you have too large a class.

I will have to say that we get tremendous backing from our management and the field supervisors on the Milwaukee Road as far as signal training priority. It has been Number 1.

Our signal training schedule is published now until the latter part of 1974 (speech given Oct. 2, 1973), and our signal supervisors will plan their work around the signal training sessions. We have only rescheduled one signal training session in three years and that was a situation beyond our control.

During this time the vacations for the trainees are prohibited.

When we enroll a class, we notify everybody in the department including the trainee that he is enrolled and what dates he is going to attend class. Our class training extends over approximately a 9-month period. This is an accelerated course. We train our men one week in class, send him back to the field for 6 weeks and then bring him in for the next class week. So we have 6 one-week sessions spread over approximately a 9-month period. We take the stand that it is actually a 7-week session 6 of it home study and one in classroom.

At the same time that the trainee is enrolled, we issue his textbooks and give him an advanced reading assignment. This advanced reading assignment is given at the end of each class session for the next.

In Week 1 an introduction to the rules is given. Rules are an ongoing situation through the whole six weeks of classroom instruction. The first week also includes discussion and introduction to train

operation and signaling with identification and purpose of signal apparatus. In following weeks, dc relays, track circuits, block signaling, crossing signals, ctc, interlockings and a basic introduction to afo are included. A general description of signal systems is given, and finally we cover meters, batteries, battery charging and energy distribution. Nothing brings me up to a start, more, than a real green man that is going to be a future signal maintainer and he doesn't know that the signal behind the train is supposed to be red. That's a startling fact. When you look at the situation, you realize that the man is coming to you, green and untrained, so you must expect this. It's up to you as trainers to change that situation.

Our class week actually consists of four 9-hour days of classroom instruction. Friday is a half day where we have an exam covering that week's instruction and a critique of that exam.

During the week we give quizzes that are really for the instructor and the students' benefits. The test results do not contribute to the student's score, but are used mainly as a teaching method. Quizzes are one means to tell the instructor how is he doing and who in the class is not getting the instruction. Also they show where the emphasis should be placed and it alerts the student to the fact that he may have to work a little harder.

Our agreement with the BofRS makes training mandatory for all assistant signalmen hired after June 15, 1971, and they must complete the signal training course successfully, regardless of whether they are advanced to a signal maintainer's job. Tests have multiple choice answers, and 70 is passing. There is a 30-day retest if a student fails the first examination. With proper diligence, a good signalman can pass it. I really feel that if a man cannot pass, we're doing him a favor by asking for his resignation, because he is not going to make it in signaling as we know it today, much less as it's happening or going to be tomorrow.

We pay and arrange for lodging and transportation for our students. Meals are paid by the students and reimbursed on an expense-account basis. There is no travel time charged the railroad for the students coming to and from class. We pay for a normal 40-hour work week although it could run over a few minutes, but everyone has been very agreeable up to this time. We have men that come as far as Montana to Milwaukee. In the case of Tacoma where they come from the western end of Montana, we fly them. Whatever type of transportation is the best suited is the one that we authorize. We don't limit any—bus, private car, airline, Amtrak.

At the completion of the 6-weeks' training, we award a certificate of completion to the men graduating from the course. At the same time, the books and everything issued to the man become his personal property. We suggest that he use them for reference material. One thing that is important to a signal training situation is the feedback from the field. When we started this training, we got feedback such as: "Your student is coming to me knowing all about a circuit—say an NWP circuit through a switch circuit controller but he can't adjust the circuit controller." That's the type of feedback that helped the training instructor change his course presentation or his signal training aids. It's important that you have feedback from the field. It's nice to have a pat on the back, but at the same time you want to know if you're not getting the message across.

In conclusion, I would like to say that the Milwaukee Road's signal training program has had positive results and the performance of the graduates, in large, has been gratifying. There is no easy substitute for experience, but a good foundation of knowledge is essential to the future signal generations.

GRS aids training

General Railway Signal Co., through its publications, films and engineers, has been in signal training since 1906. GRS activities were described by Hugh C. Kendall, senior consultant, technical marketing, at the Committee G workshop.

We've been in training since 1906, starting in with our switch machines. We have a GRS publication directory which contains a complete digest of everything available in printed form. It lists all of our systems and devices, such as switch machines, track relays, etc., by bulletin number. These bulletins are generally available through our district offices and from the advertising and sales promotion department in Rochester, NY.

Specifically, we have a number of bulletins having to do with general concepts. An introduction to centralized traffic control takes CTC from the basic unit-wired systems up through the more modern relay coding techniques to the electronic coders of today. Also, we have a bulletin that covers the E-2 coding system and the type F carrier, which contains more detailed information on a specific system. This bulletin, for example, written from an installation and maintenance standpoint, would enable a competent maintenance man with a reasonable background to understand and maintain the system.

Concerning our slide literature, we have a series of colored 35 mm slides on the basic concept of the Robinson track circuit. Each one of these slides is the source material for a lecture with a pointer of 10 to 15 minutes. All of the elements are there. It's easy to follow, and is used very extensively in basic training of our new employes as well as invited people who come to us in training programs.

Typical of other slides we have are ones covering the half-wave track circuit, the block signal polarized track circuit, the SA searchlight signal and the basic breakdown of a type K flasher relay. We have several slides that can be the basis for a 1 hour lecture on highway crossing circuits with overlay track circuits. A simplified switch layout slide is basic for talks on the importance of lock rods and the adjustment of the switch, throw rods, etc. Other slides deal with track code, relay interlockings and unit-wired ctc.

We have several motion pictures, generally using 16 mm film with sound of some of our major installations. Typical are films dealing with the freight yard, the railroad signal, railroading with radar (SP's Englewood yard in Houston, TX), electronic railroading, Robert R. Young yard, (PC yard at Elkhart, IN), Road of the Future (Carol Mine automatic rail operations), and the City Changes in Control (rapid transit).

With the new, modern complex systems, we have people come to our main plant and office in Rochester, NY, for a two-day training session.

Solid-state controllers replaced electro-mechanical contactors for retarder control at CN Toronto yard.

CN uses solid-state retarder controls

Due to the high volume of retarder operations, Canadian National at its Toronto yard has replaced the standard electro-mechanical contactor units with solid-state controllers. The story behind the change as well as how the solid-state controllers operate was described at last year's northern sectional meeting of the Communication & Signal Section, AAR, by two CN signal supervisors—H. R. Hart and N. H. Kightley. The paper is presented herewith.

The original installation of Canadian Nationals' Toronto yard employed the standard electro mechanical contactor units for the control of retarder motors. After a few years experience, we decided to convert to the recently developed solid state retarder control units. The following are some factors that weighted that decision, followed by a brief description of the basic operating principle of the new system.

The demands placed upon these units is quite rigorous. They must control a 265-volt dc, 5 hp motor under conditions that require frequent starting, stopping and reversing, including mid-stroke reversal and the application of dynamic snubbing on each move.

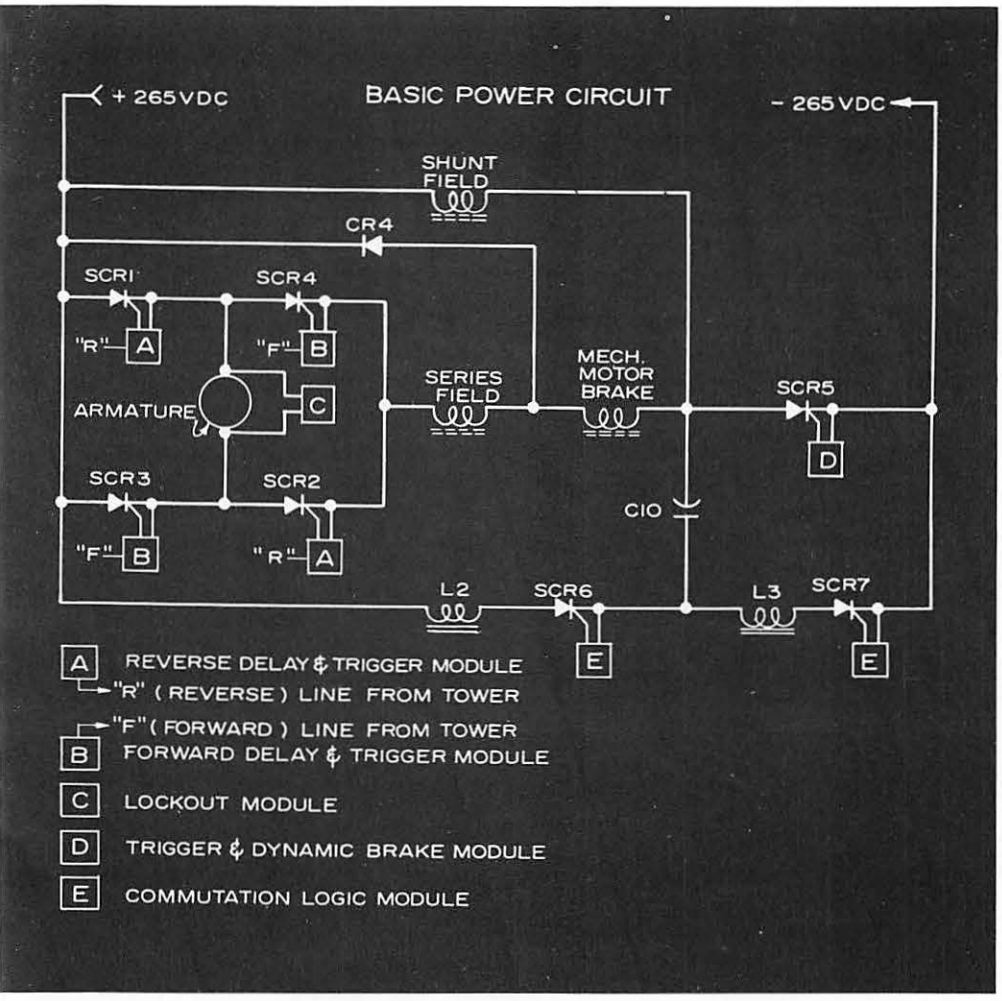
An example of the repetition rate of these demands in our application is indicated by the following statistics:

Toronto yard consists of a dual pump with two master retarders and nine group retarders and a local pump with one master retarder and six group retarders. A typical days' traffic involves the humping of 4,000 cars, which, due to the fact that a certain percentage of these are humped as "two-car cuts," results in the handling of an average of 3300 cuts per day through the retarders.

Each cut must pass through six retarder mechanism sections. Each section will operate as many as six times per cut. This produces a figure of 118,800 retarder mechanism operations per typical day.

Breaking this down further, to the mechanical movements involved within the controller panels, reveals that for every mechanism movement in each direction, two mechanical contactors must operate. This then produces a total of 239,600 mechanical contactor switching operations per typical day; an average of 5,705 operations of each of the 42 panels in service.

When we take into consideration the fact that a high percentage of these switching operations are initiated with the motor under heavy load and that each operation also involves the application of dynamic snubbing to quickly stop the motor and that in the process of



Basic circuit of the solid-state retarder controller.

doing this, the components are subjected to potentials of many hundreds of volts and a few hundred amperes of current, it is not unreasonable to expect irregularities with mechanical contactors.

Some of these irregularities of mechanical contactors resulted in mishandling of traffic due to one of the following conditions:

(a) Retarder failing to respond to the command to move to a closed position, thereby resulting in overspeed exit of the car.

(b) Retarder failing to respond from a closed position, thereby holding the car and sometimes resulting in a collision from the following car.

Reasons for these irregularities were:

1) Insulation breakdown in any of the various components due to the high potentials generated.

2) Mechanical breakdown due to fatigue, wear, foreign matter in pivot points, etc.

3) Failure of humans to retain critical tolerance to specifications through periods of alterations due to wear, contact erosion, etc.

One might well say this latter should never occur, but we may as well be realistic and recognize this as a factor of continuing concern when dealing with the maintenance of mechanical devices in applications that are particularly demanding, and rigid tolerances must be maintained in order to realize optimum performance, and, of course, an important factor is the cost in manpower in attempting to achieve this.

In view of the foregoing, we discussed with the General Railway Signal the possibility of obtaining retarder control units of solid-state design. Shortly thereafter they made available to us a prototype solid-state retarder control panel for evaluation in field service.

After a lengthy period of excellent service from this prototype unit, the decision was made to purchase 44 of them to replace all the electro-mechanical contactors in Toronto yard. This decision was based on the average annual cost of labour and material to maintain and repair the mechanical units versus the expenditure for the solid-state units, which resulted in a potential saving of approximately 19% per year on the investment.

It should be borne in mind that this figure is dependent to a large degree on the volume of traffic through particular retarders and may therefore differ from one yard to another.

Factors pertinent to the design of the solid-state controller.

1) The selection of components in an acceptable price range that would withstand the high voltage and high current switching in the power circuits. (The power SCRs have a surge current rating of 2,000 amp).

2) The design of control circuitry to gate on the SCRs and then switch them off after they are "locked on" by the direct current in the power circuit.

3) The application of dynamic snubbing to the motor for instantaneous stopping in either direction.

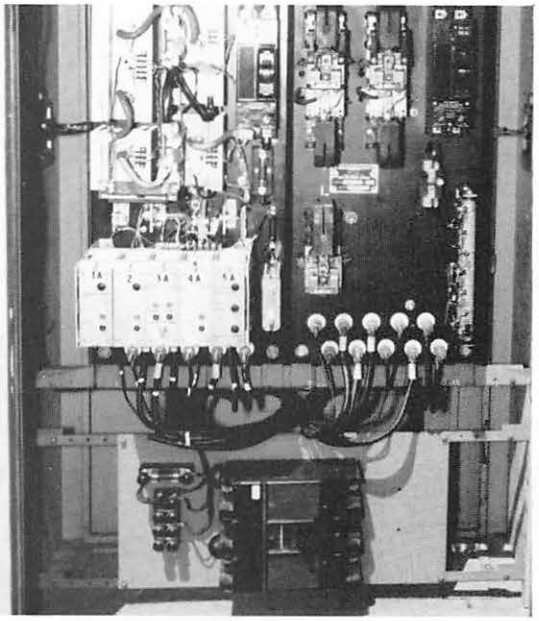
4) The requirement to perform through a wide temperature range.

5) The solid-state unit to be made to the same dimensions and mounting configurations as the original mechanical unit to minimize conversion time.

6) Must meet the foregoing requirements within a price range that is economically viable.

The basic power circuit diagram shows only the main components of the power circuit. Many other components are employed for protection from shorts, overloads, transients, etc., as well as the complex circuitry of the five logic modules (printed circuit boards).

Forward move — (To close retarder). DC potential is applied to the "F" (forward) line by the control circuitry in the tower. This activates the transistorized circuitry of the "Forward Delay and Trigger Module" which creates pulses that are applied to the gates of SCR3, SCR4 and SCR5 initiating current flow to release the mechanical motor brake and start the motor in the forward direction. Simultaneously the presence of voltage at the armature activates the "lock-out" circuit which disables the forward and reverse trigger modules to ensure SCR gate pulses cannot be created while driving power is being supplied to the motor. The SCRs that had been gated on are



Prototype solid-state units (center left) were installed on a test basis.

"locked on" by the DC flow in the motor circuit.

When the retarder reaches the requested position, energy is automatically removed from the forward line, but since the conducting SCRs are "locked on" by the DC flow, the logic circuitry must instantly initiate action to turn them off. Therefore, when the removal of the forward command signal is sensed by the "Commutation Logic" circuitry, it initiates gate pulses to SCR6 and allows current flow into capacitor C10 through coil L2 and the inductive effect of L2 causes C10 to charge to a potential of about three times the supply voltage. SCR6 then switches off and SCR7 is gated on to allow the high potential of C10 to reverse bias SCR5 and switch it off to stop current flow in the power circuit. The instant SCR5 ceases to conduct the condition is sensed by the "dynamic brake logic" circuitry which now initiates gate pulses to SCR1, SCR2, SCR3 and SCR4. This provides a path for the counter EMF through the opposite SCRs, the armature, series field and diode CR4 which will quickly stop the motor. When the motor has ceased rotation, the absence of potential at the armature releases the "lock out" circuit and the motor can again be run in either direction as required.

Reverse move (To open retarder). DC potential is applied to the "R" (reverse) line by the control circuitry, which activates the circuitry of the "Reverse Delay and Trigger Module" and applies gate pulses to SCR1, SCR2 and SCR5 to run the motor in the reverse direction. After this point, the sequence of events is the same as described for the forward move.

Mid-stroke reversal. When a retarder has received a command to move to any other position, it can at any instant accept a command to stop and reverse direction prior to fully reaching the position to which it was initially commanded. This is accomplished by removal of command from either the "F" or "R" line, depending on which direction was initially requested, and the immediate application of command to the opposite line. This is most likely to occur when a car is very near the computed control speed and the radar signal is requesting very minor speed changes to retain the cars speed near as possible to zero error, or when there are significant momentary fluctuations of the radar signal.

In order that the operating mode of a unit can be readily determined without the use of instruments, indication lights are provided on each unit to display the following: 1) Main power on; 2) unit power supply operating; 3) forward command signal on; 4) reverse command signal on; and 5) lockout circuit activated.

Each of the five logic modules (printed circuit boards) are plug coupled and can therefore be quickly interchanged should a situation appear to warrant it.

Preventive maintenance: Occasionally dust the unit to remove any accumulation of conductive dust. While doing so, make a general check of wire connections, etc., to ensure they are tight and clean, and inspect the oil filled capacitors for signs of leakage.

Leakage to ground can have a more adverse effect on the operation of the solid state units than on the mechanical type, therefore, retarder motors, wire, cable, etc. of the retarder power and control circuits should be maintained to a reasonable standard in that respect.

The term "reasonable" has been applied because carbon dust, etc. will accumulate in the motors and create some path to ground. We have found no problem with unit performance in mechanisms where the motors were reading one-half megohm to ground. Periodic meggering of motors would appear to be good practice whether or not solid state controllers are in use.

When the production models were placed in service, abnormalities were experienced which, for some unknown reason, had not occurred with the prototype. These problems proved to be mainly in two categories:

1) False gating of SCRs due to "noise" pulses in the gate circuitry.

2) SCR breakdown due to extreme voltage or current surges.

To overcome these problems, the supplier found it necessary to make modifications in the form of additional suppression networks, etc. The performance since these modifications were made appears to indicate these problems have been resolved.

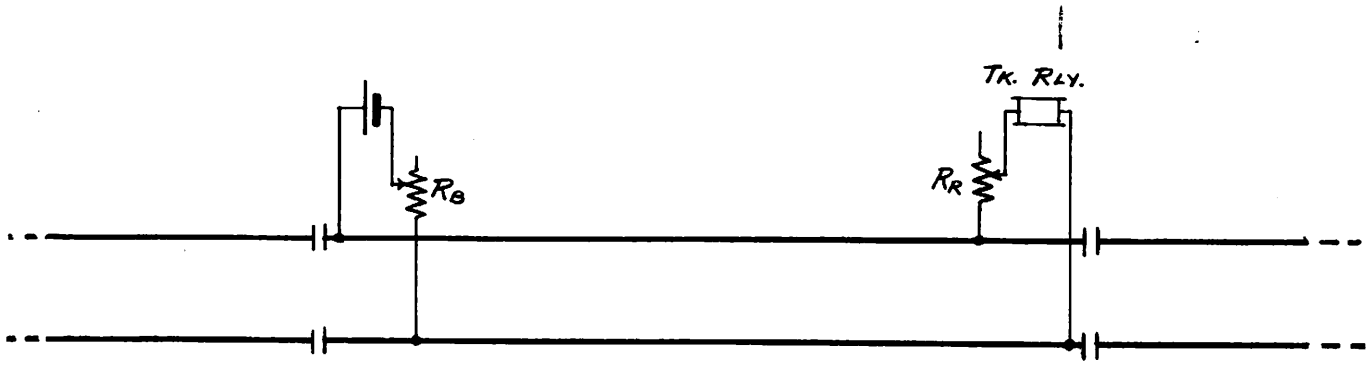
We still experience retarders running out of mesh occasionally, for which no cause could be found, but since there are many things other than the controller that can cause this, it would be unfair to imply at this time that the Solid State Controllers are at fault. A continuing effort is being made by General Railway Signal and us to ascertain the real cause.

During a lightning storm last year we experienced a failure of one unit that appeared to have possibly been caused by a surge on a control wire. Since then we have installed coiled leads in the 265-volt lines and the "F" and "R" lines where they connect to the units to aid in surge protection. There has been no recurrence to this time.

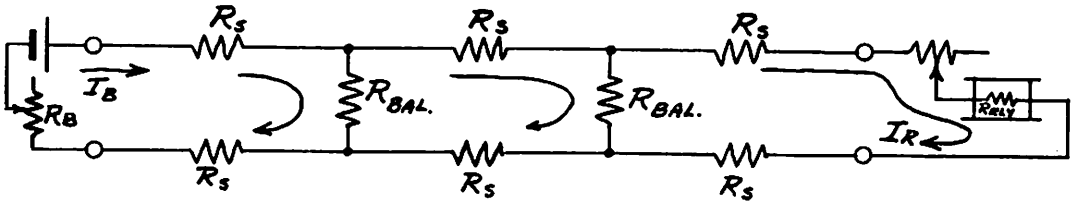
We are realizing the savings in material and labour that we had anticipated when the decision was made to purchase the Solid State Retarder Controllers and present indications are that this will continue.

SCL and Southern to install interlocking

Seaboard Coast Line and Southern have received approval from FRA's Railroad Safety Board to make modifications to signal systems protecting a single-track SOU line with a double-track SCL line at Meads Crossing, SC. An SCL-SOU connecting track with power-operated switches at each end will be installed, approach locked derails will be removed, and the interlocking will be remotely controlled by the operator at SY under the supervision of the SCL dispatcher at Florence, SC.



TYPICAL INSULATED JOINT TRACK CIRCUIT



$R_S \approx .015$ OHMS/1000 FT. (WELDED RAIL) D.C.
$R_S \approx .08$ OHMS/1000 FT. (WEB BONDED RAIL) D.C.
$R_S \approx .23$ OHMS/1000 FT. IMPEDANCE AT 60 Hz.

$R_{BAL} = 1$ OHM-1000 FT. (POOR WET BALLAST)
$R_{BAL} = 200$ OHMS-1000 FT. (DRY OR FROZEN BALLAST)

EQUIVALENT CIRCUIT

FIGURE 1 illustrates a typical dc track circuit.

Audio frequency track circuits:

Editor's Note: Because of their many advantages, such as elimination of insulated joints, audio frequency track circuits have been widely applied. However, there are problems in their operation. Tradeoffs in the design and applications of these circuits were discussed at the Communication & Signal Section, AAR, annual meeting last fall. K. H. Frielinghaus, senior research engineer, General Railway Signal Co. described the choices available to users. His paper begins herewith.

During the first 75 years since Dr. Robinson patented the closed circuit principle track circuit in 1872, much work was done to perfect and refine insulated joint track circuits of the d-c, a-c power frequency and coded variety. Despite the many years of development and application, there still are some puzzling track circuit phenomena that are difficult to explain or analyze.

In the 1950's the first audio frequency jointless track circuits were developed with the availability of reliable industrial transistors. At first it appeared that these new audio frequency track circuits had many advantages over the former insulated joint track circuits, such as no requirements for insulated joints, apparent compatibility with d-c and a-c electric propulsion, overlapping and multiple track circuit capability, multiple receiver capability, ease of installation and adjustment, and immunity to foreign currents and signals. As these jointless audio frequency track circuits came into general use, many problems, not at first readily apparent, were uncovered which resulted in some acute application constraints; and new problems are still evolving.

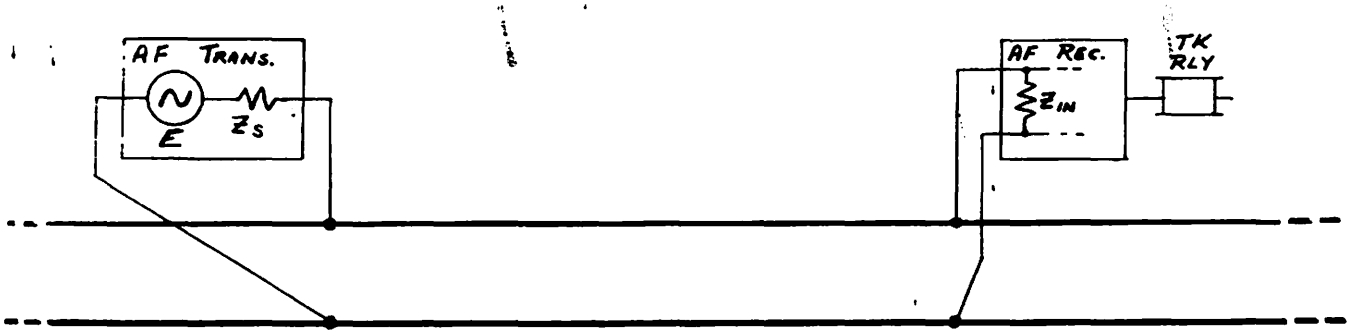
In retrospect, it appears that the number of track circuit design and application problems of the insulated joint track circuits are few in comparison to the problems related to audio frequency jointless track circuits.

The main new factors of audio frequency track circuits that complicate their application are increased losses, mainly due to the series inductive rail impedance, which is substantial at audio frequencies, and the loss of efficient isolation previously provided by the insulated joints.

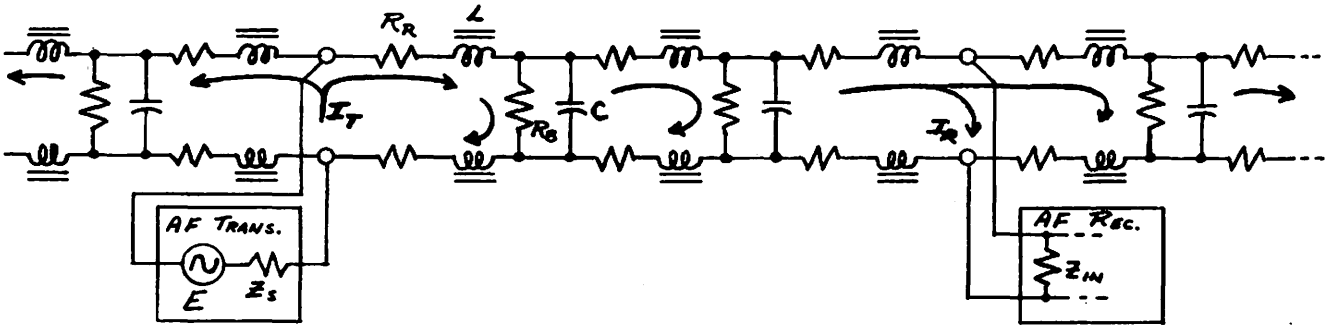
To illustrate these problems better, let's review the major design considerations of insulated joint track circuits.

Figure 1 illustrates a typical d-c track circuit, but by substituting an a-c source and some form of a-c relay, this illustration could also be considered as an a-c track circuit.

In the initial use of the d-c track circuit, it was determined that if battery resistance RB were made equal to the receive end resistance, consisting of RR and the relay resistance, the track circuit provided the highest shunting resistance sensitivity, ability to oper-



TYPICAL JOINTLESS AUDIO FREQUENCY TRACK CIRCUIT



EQUIVALENT CIRCUIT

FIGURE 2 shows the typical voltage sensing audio frequency track circuit.

operation and adjustment

ate to a low minimum ballast resistance, and equal shunting sensitivity at both the transmit and receive end. As a result, this was classically known as a balanced track circuit.

Although this type of d-c track circuit arrangement and adjustment provided good detection on heavily traveled mainlines, uncertain shunting was experienced when rust or an oxidized film formed on branch line rails with a low volume of traffic. By laboratory experimentation it was discovered that this insulating barrier could be broken down by a sufficiently high inter-rail voltage which is often called the ionization voltage. This so-called ionization voltage varies from .3 volt to .7 volt depending on the metallurgical characteristics of the rail and the wheel and on the thickness of the rust film. This ionization voltage is similar to the forward drop of a diode, with the exception that the rail-to-wheel voltage-current relationship becomes linear once the oxidized barrier has broken down; but for a rolling car this may be a continuous recurring breakdown phenomenon.

To minimize or avoid this poor shunting characteristic due to the ionization voltage effect, the unbalanced track circuit was developed, which reduced battery end resistance RB and substantially increased the relay end resistance to raise the interrail relay dropout voltage to above the ionization voltage for that section of track. While this unbalanced circuit reduced the shunting resistance sensitivity by about 30%, it improved train shunting capability on rusty rail by over 400%. Unfortunately, the unbalanced circuit also increased the minimum operating ballast resistance capability and resulted in unequal shunting sensitivities at its ends. These disadvantages are not serious and are outweighed by the substantial increase in rusty rail shunting capability.

The unbalanced d-c track circuit may also be used in situations where single unit Budd type cars might be used. By use of unbalanced circuits, the maximum track relay current may be only 3 times above relay dropaway instead of almost 10 to 1 above the relay dropaway for balanced circuits, thus resulting in fast relay dropaway and slow pick up to provide the correct track relay sequence as a fast Budd type car crosses an insulated joint.

Many of these same design considerations are true for a-c power frequency track circuits, since the a-c series rail reactance at 60 Hz rises to only about four times the d-c rail resistance. As far as the ionization voltage is concerned, a-c track circuits have an edge over d-c circuits, since the peak a-c voltage for a full wave sinewave is 1.41 times its rms value and for a half wave sinewave is 2.82 times its rms value. This permits reducing the rms a-c inter-rail voltage while

still overcoming the ionization voltage.

The typical voltage sensing audio frequency track circuit in Figure 2, shows a number of differences over the insulated joint track circuit. First, the transmitter output is split two ways, with one half of the output energy flowing in the track circuit toward the receiver, and the other half flowing in the track section away from the track circuit —energy which is lost unless this happens to be a centerfed track circuit configuration. Second, the receiver is essentially bridged across the track with only part of the track circuit signal current being received by the AF receiver, with the remainder being lost in the continuing track. The continuing track past the receiver also acts as a load in parallel with the receiver, which varies with ballast resistance changes and the approaching shunting effect of a train, thus changing the load on the receiver. The same is true at the transmit end. Third, the series rail inductive reactance predominates over the series rail resistance at audio frequencies and rapidly increases track signal attenuation throughout the audio frequency range.

Figure 3 provides an idea of the magnitude of the series rail inductive impedance as related to the a-c and d-c rail resistance vs. frequency. At 500 Hz, the series inductive inpedance is about 25 times greater, while at 5000 Hz it rises to 225 times greater than the d-c rail resistance, thus rapidly increasing signal attenuation with increasing track circuit frequency.

Fourth, the leakage of the shunt capacitance, shown in Figure 2, becomes noticeable at audio frequencies, especially at high values of ballast resistance and high frequencies. Typically, the shunt capacitive impedance is 30 times greater than the ballast resistance at 100 Hz and 5 ohms ballast, but at 10,000 Hz and 200 ohms ballast this shunt capacitive impedance is about equal to the ballast resistance.

These last two factors substantially reduce the maximum length of audio frequency track circuits in relation to insulated joint d-c and a-c track circuits and, since the series rail inductive impedance and shunt rail capacitive impedance become more prominent with increasing frequency, maximum operating track circuit lengths decrease with frequency. One's first reaction upon seeing that the received signal has been attenuated below the minimum operating level of the audio frequency receiver is to consider increasing the transmitted power or the receiver gain until it is sufficient to pick up the track relay. If the track circuit were just a communication link, this may be a valid action, but since a track circuit is also, and more importantly, a train detection system which must operate correctly within two boundary conditions, this becomes an invalid and unsafe action. One boundary condition is the received voltage at the lowest expected ballast resistance with no train influencing the track circuit. The other condition is the received voltage at the maximum ballast resistance with an .06-ohm shunt at the receiver or transmitter. For safe operation of the track circuit, the first condition must result in a higher received voltage than the second condition, and the receiver gain must be set to just pick up the track relay at a received voltage that is between these two boundary conditions.

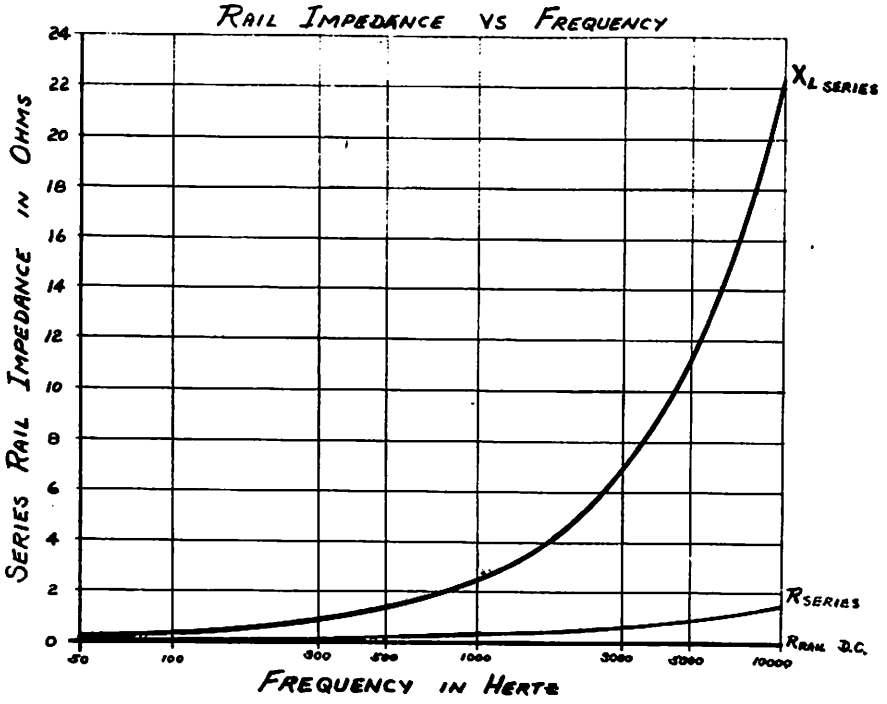


FIGURE 3 shows the magnitude of the series rail inductive impedance.

Figure 4, a family of curves for different ballast resistances and no train shunt, shows relative receiver voltage vs. track circuit length. A single curve across the lower end shows relative receive voltage vs. track circuit length for a track with a ballast resistance of 200 ohms in 1000 feet and a .06-ohm shunt at the transmitter or receiver. As shown, the figure is based on a track circuit frequency of 1150 Hz on 90 lb. rail. Let us consider a typical track circuit installation in an area where the ballast is known not to drop below 5 ohms in 1000 feet. For a maximum ballast resistance of 200 ohms, a safe track circuit operating range is shown by the gray shaded area bounded on the top by the 5-ohm ballast and no shunt signal attention curve, and on the bottom by the 200-ohm ballast and .06-ohm shunt curve. Note that at approximately 6900 feet these two curves cross over. This crossover point indicates the theoretical maximum track circuit length for the given conditions of ballast range, frequency, rail size, equipment impedance, and shunt resistance value. It was indicated earlier that for each set of fixed conditions there was a maximum track circuit length, and that increasing the output of the transmitter or gain of the receiver could not increase the theoretical maximum track circuit length. These two curves indicate why—because an increase in transmitter output raises both curves simultaneously and there is no horizontal shift of the crossover point in the two curves. Increasing the receiver gain does the opposite. It lowers the two curves, with again no shift in the horizontal position of the crossover point. For a given set of fixed conditions such as frequency, equipment impedance, etc, the only way to increase the theoretical maximum track circuit

length is to reduce the range of ballast resistance over which the circuit has to operate safely. For example, if the ballast and ties are maintained so that the minimum ballast does not drop below 10 ohms in 1000 feet, the upper curve for the safe operating zone becomes the 10-ohm ballast, no shunt curve, and now the crossover point has shifted to the right to approximately 10,800 feet. Therefore, the maximum theoretical track circuit length is 10,800 feet if the ballast resistance does not exceed 200 ohms or drop below 10 ohms.

On the other hand, if the ballast is known to drop to 2 ohms in 1000 feet, theoretical maximum track circuit length drops down to 3500 feet.

Note, if the ballast resistance range is reduced by limiting the maximum ballast resistance to something less than 200 ohms in 1000 feet, the lower boundary high ballast curve with a .06-ohm shunt would drop down slightly, causing the crossover of the two curves to shift to the right, thus also increasing the maximum theoretical track circuit length.

This track circuit length analysis is valid for audio frequency track circuits and for d-c and a-c power frequency track circuits. Because the attenuation at d-c is so much less, the two operating condition curves cross over at 20,000 to 40,000 feet. Since d-c and a-c track relays are usually designed with a 50% drop to pick differential, these maximum track circuit lengths were not realized until coded track circuits were developed, and then only partially.

To be continued

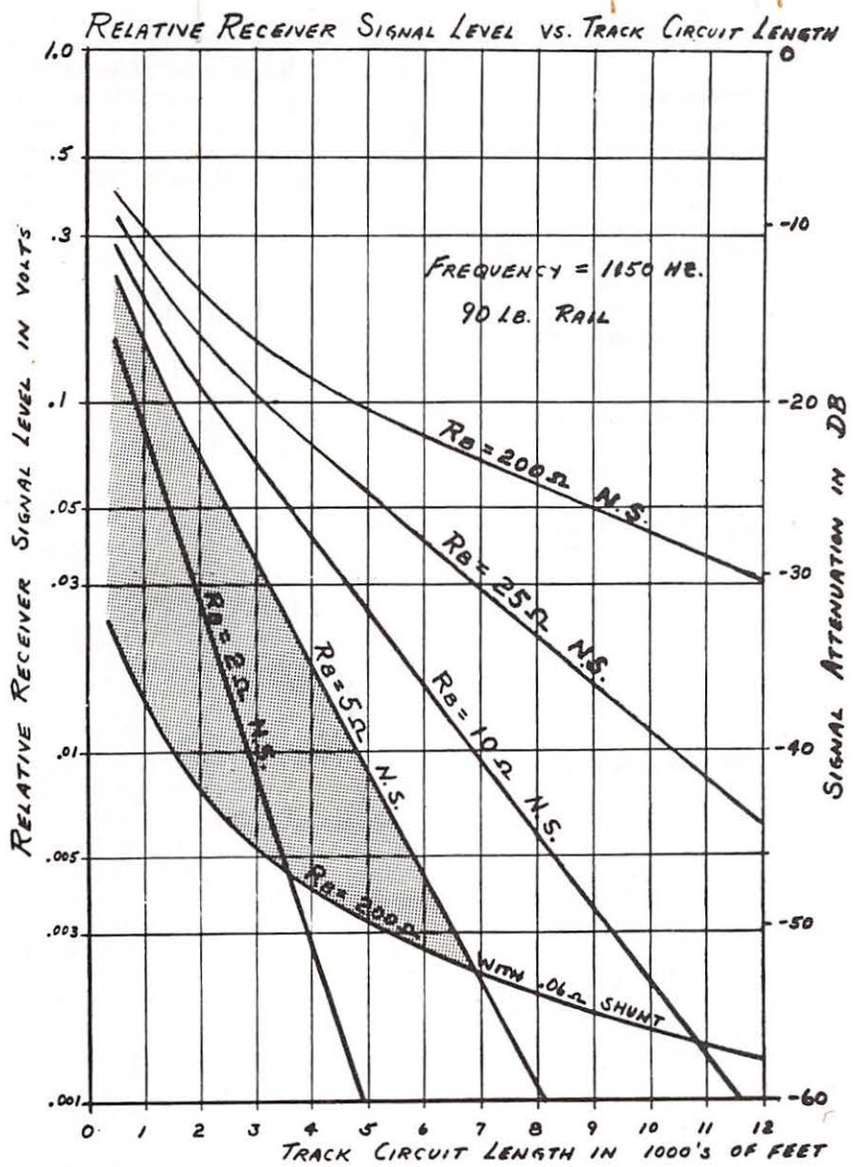


FIGURE 4: curves for different ballast resistances.

EL gets ok to install ctc

Erie Lackawanna received approval from FRA's RR Safety Board to install a traffic control system on one main track to be controlled from the dispatcher's office at Scranton, PA, replacing automatic block signaling arranged for current of traffic operation on two main tracks between Factoryville and Nicholson, PA., about 3 miles. Reason for the changes, says EL, is to single-track Nicholson Tunnel so one main track can be moved to the center of the tunnel to provide for greater clearance for high-wide shipments.

PC gets FRA ok to install ctc

Penn Central has received FRA's RR Safety Board approval to install a traffic control system replacing existing automatic block signaling arranged for current of traffic operation by signal indication on tracks Nos. 1 and 2 between Town Line and Wayne Jct., MI, about 11 miles. PC also received relief from signal RS&I Section 236.21 in that it can install 8 automatic signals to the left instead of over or to the right of the track governed.

DM&IR adds remote control interlocking

FRA's Railroad Safety Board has given approval to the Duluth Missabe & Iron Range to install a power-operated switch replacing hand-operated switch at a junction of the southbound track with the scale track at Adolph, MN. Also, DM&IR will install 3 controlled signals, change aspects of one signal, add an approach-diverging aspect to another signal and remotely control the signals and switch from the Proctor yard office. The installation is made because a change in operating practice requires certain taconite trains to by-pass the scale and enter the yard via the southbound track.

CANADIAN NEWS

(Continued)

Brother Reynolds with a wallet containing the donations received from his fellow employees. Brother **G. T. Turner,** local chairman west, presented him with a unique gift from Local 204—an engraved desk set, centered by a scale working model of a train order signal. This gift was the work of Brother **R. Matte,** signal maintainer at Mt. Albert, Ont.

Special guest BofRS President **Charles J. Chamberlain,** addressed the gathering and wished Brother Reynolds all the best for the years to come. Other guests included Brother Reynolds' family; **J. E. Platt,** BofRS, vice-president; **R. R. Mitchell,** BofRS grand lodge representative; **P. G. O'Malley,** CN, regional engineer of signals; **G. E. Casey,** regional supervisor of signals; and many others.

GTW official says DOT rail plan objective

John H. Burdakin, executive vice-president of the Grand Trunk Western, says the Department of Transportation's extensive recommendations effecting 61,184 miles of railroad tracks in a 17-state area of the Northeast and Midwest is "clearly bounded by checks and balances which protect consumer interest."

"Although the DOT study indicates 37% of the trackage in Michigan is minimally used and potential for abandonment consideration," Burdakin said, "97% of present traffic would be retained. Important to remember" he continued, "is that the DOT's complex recommendations must travel through five major steps before final Congressional approval scheduled for March 1975. Obviously, it is premature for Grand Trunk or any railroad to make comments on specific areas of track, or possible effects until each railroad has had time to make its own assessment and input into this giant package of proposals.

"In our judgment," Burdakin continued, "the DOT study is an objective and honest approach to the railroad financial crisis in the Northeastern part of the country. Because these proposals extend over a 17-state area, 61,184 miles of trackage, and involve extensive railroad holdings, every railroad is obligated to make an in-depth study of these far-reaching recommendations." There will not be arbitrary cuts of freight rails in Michigan. There will be ample opportunity for railroads as well as consumers to voice approvals or disapprovals.

"At Grand Trunk, we plan to cooperate to the fullest extent with all levels of government, the ICC, and the newly created U.S. Railway Association. We will do so because we are confident the legislation is necessary to prevent nationalization, to permit improvement in the railroad industry in the Northeast, and to adequately protect consumers throughout the country."

Obituaries

M. J. Haag, retired member of Local 212, Penn Central (New York Central, Lines West) passed away recently. He was 77.

Brother Haag retired March 31, 1960 after completing 41 years of service with the New York Central. At the time of his retirement he was employed as a signal inspector at Springfield, OH.

The officers and members of Local 212 extend their deepest sympathy to the members of his family.

John E. Holmes, member of W. J. Gillis Local 167, Canadian National, passed away Oct. 17, 1973. He had been a resident of Tourville L'Islet, Quebec.

George O. Hout, retired member of Local 94, Baltimore and Ohio Lines West, passed away September 29, 1973. He was 71.

He retired in June of 1962 after completing 42 years of service with the B&O. At the time of his retirement he was employed as a signal inspector at Flora, IL.

Brother Hout was an active member of Local 94 and served as an officer.

He was buried with Masonic rites at Flora.

Surviving are his wife, Marion; one son, Darrell E. of Henderson, KY; three daughters: Peggy Kuder, Henderson; Ernestine Eskew, Flora; Jeannine DeLaney, Wichita Falls, TX; and ten grandchildren, to whom the officers and members of Local 94 extend their deepest sympathy.

Merle L. Johnson, member of Local 220, Milwaukee Road, passed away the middle of October, 1973.

At the time of his death Brother Johnson was employed as a signal maintainer.

He is survived by his wife, Frances, and three children, residing at Box 18, Groton, SD 57445.

The officers and members of Local 220 extend their deepest sympathy to his family.

J. B. Kemp, member of Frisco Local 129, passed away May 24, 1973. He was a resident of Joplin, MO.

Donald Leach, member of Winton Local 94, Baltimore & Ohio Lines West, and Dayton Union, passed away Sept. 9, 1973. Brother Leach, 58, was a signal maintainer, and resided at Blanchester, OH.

Gerald C. Lewis, member of Miller-Griffith Local 49, passed away in July, 1973. Brother Lewis was a signal maintainer on the Southern at Oneida, TN.

William J. May, member Gateway Local 135, Chicago and Cincinnati Divisions, Chesapeake & Ohio, passed away Sept. 29, 1973. He had been a resident of Denver, IN.

Calvin L. Morris, member Local 16, Seaboard Coast Line and Jacksonville Terminal, passed away Feb. 9, 1973. Brother Morris was a resident of Savannah, GA.

Charles Noll, retired member of Local 102, Penn Central, (former Pennsylvania) passed away November 13, 1973. He was 71.

At the time of his retirement Brother Noll was employed as a signal foreman on the New York Divison at Newark, NJ. He retired July 1, 1966 after completing over 46 years of service with the Pennsylvania.

The officers and members of Local 102 extend their deepest sympathy to his wife, Eleanor, and the members of his family.

M. C. Vearrier, member Roseburg Local 152, Southern Pacific, passed away July 28, 1973. Brother Vearrier was a resident of Oakridge, OR.

popular campers and other recreation vehicles and of big cars, found that because of the gas shortage, market values had dropped in some cases to perhaps half of what they still owed on their purchases Some of these debtors simply let the vehicles be repossessed.

Significantly, the deliquency rate on personal loans has remained stable in comparison to the higher delinquency rate on vehicle debts.

An increase in the delinquency rate on mobile homes also has been reported. This trend, if it continues, may be even more worrisome than the delinquencies on campers and large cars. In a time of expensive housing and reduced construction, mobile homes have become an important alternative for two relatively low-income age groups—young families and retired couples.

The delinquency rate on household appliances also has increased.

Keep in mind that letting goods be repossessed does not not necessarily solve the debt problem. You may still be liable for a deficiency judgement, including repossession costs, since such goods usually bring only low prices on resale. A private sale, even if relatively more difficult to achieve, may bring more money than the finance company or dealer may credit to your debt if they resell the goods.

If you can't avoid a repossession, write to the finance company and tell them you expect them to try to get the highest possible resale price.

The other side of the coin, literally, is that there may be bargains in repossessed goods now. If you are looking for a mobile home, or a used appliance or even a moderate-size camper, you might start by contacting local banks and finance companies, and reputable dealers.

HOME HEATING COSTS: While the heating season is coming to an end, the financial impact has been severe. Authorities estimate that a six-room house in the moderately cold parts of the country needs about 1,500 gallons of oil. Thus, without even counting heating water, at recent prices of 33 cents a gallon in some areas, such a house now costs about $500 to heat. Add another 250 gallons for hot water and the cost rises $83 more. Thus, continued attention to conserving hot water and heat are necessary to restrain this big new living-expense item.

APRIL SALES: April is a good month to shop for clothes. Among important sales this month are women's dresses; lingerie and housecoat's; men's and boys' suits and coats, and infants wear.

FOOD BUYING CALENDAR: Meat is temporarily a little cheaper this month but will start going up again with warm weather. The real food values this April are broilers and turkeys (cheaper than a year ago) and eggs, now in their flush season.

Recent increases in bread prices have added to already-high family food costs. Note that the spread between stores' own brands and advertised brands of bread have increased so that the difference now often is 7 to 10 cents, *Supermarket News* Reports.

Washington Report

By R. E. Porter

A hornet's nest was set abuzzing when the Department of Transportation recently unveiled its preliminary recommendations for a drastically reduced Northeast (and Midwest) rail network.

The recommendations were issued in line with the new law passed last year by Congress, which provides for a restructuring of the Penn Central and seven other bankrupt carriers in the region. The DOT proposals constituted the first step in a 21-months process slated to culminate with congressional action on the final form of the slimmed-down system.

As set forth by Secretary of Transportation Claude Brinegar, the DOT plan would trim 15,575 miles, or over 25% out of the 61,000 route miles of both bankrupt and solvent roads in the 17 states of the Northeast quadrant, plus the District of Columbia.

The 15,575 miles were identified as "potentially excess." What is left, Brinegar said, would be a "revitalized rail network," capable of yielding a profit—some day, at least. He claimed the remaining mileage could handle "about 96% of the region's rail traffic."

In advance, the Wall Street Journal predicted that the DOT report would "generate a considerable uproar in communities" throughout the region, and the uproar began developing as the various states and communities discovered what they would lose if the Brinegar blueprint were put into effect.

Much of the uproar will also show itself at a series of hearings into the DOT plan scheduled by the Interstate Commerce Commission in cities all over the region. Public officials, shippers, union representatives and others were slated to air their views at these hearings.

Brinegar explained that the DOT report, and the testimony accumulated at the ICC hearings, will be utilized by the United States Railway Association "as a starting point for its work in actually designing the new rail system." That Association, now being formed, has the major responsibility under the law to pilot the restructuring process. The "final system plan" it formulates will go to Congress for acceptance or rejection. That point will be reached late in 1975.

Significantly, the DOT's preliminary plan went beyond the bankrupt railroads and called for a reorganization of the entire rail system in the region. The DOT put it this way: "A fundamental restructuring, including both bankrupt and solvent carriers, is required."

Thus, the plan would provide for consolidation of "highly duplicative and under-utilized individual mainlines in the region"—bankrupt and solvent—"into a high volume network." Under this setup, many cities would lose competing rail services they now have.

Brinegar said competition would be maintained only "between major traffic generating centers which provide a sufficient volume of rail traffic to produce at least eight train loads per day, each moving more than 200 miles in the same general direction." Other points, he insisted, "do not require mainline service by more than one railroad."

In carrying out this objective, Brinegar explained, it would be necessary to coordinate the services of prosperous railroads with the Consolidated Rail Corp. which is to be set up under the law to operate the final "core" system.

For this purpose, the DOT urged the prosperous carriers in the region to "become full participants in the planning and restructuring process." The DOT listed 35 solvent railroads, large and small, as operating in at least parts of the region.

The preliminary restructuring scheme proposed by the DOT was detailed in three printed volumes, running to about a thousand pages. However, at this stage the DOT declined to give any estimate as to

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DC report

(Continued)

the impact the proposed restructuring would have on the 115,000 employes of the eight bankrupt lines, or the possible impact on employes of the solvent roads.

Too many uncertainties remain, DOT spokesmen asserted, before the job impact could be calculated with any degree of certainty. It would depend, they said, on the shape of the final plan; on the extent to which lines marked for abandonment are taken over by states and communities, with the help of federal subsidies; on the volume of traffic to be maintained, and on other factors.

In any event, the restructuring law, known as the Regional Rail Reorganization Act, provides up to $250 million of federal funds to compensate employes adversely affected, including continuation of salaries to age 65, or until death, resignation, or retirement. Rail unions played a major role in securing this protective provision in the law.

Should the DOT's preliminary plan be put into effect, it would eliminate hundreds of branch lines, as well as some competing main lines. Only the major cities in the region would have service from more than one railroad. This shrinkage of service is expected to be fought fiercely in the months to come.

Brinegar claimed that the ultimate reduction would be less than 25% in mileage and 4% in freight, depending on the extent to which communities take advantage of the 70% federal subsidy payable to government entities which wish to retain lines slated for abandonment.

The DOT estimated that the proposed reorganization would save at least $315 million a year. Considerable sums would be spent, the DOT indicated, on modernizing those parts of the system having high volume of traffic. In the words of Brinegar, "the resulting streamlined system would promise high usage and thus warrant a modern modernization program."

Only 19 "major traffic centers" were listed by Brinegar as eligible for competitive rail service. These include: New York, Newark (N.J.), Boston, Philadelphia, Baltimore, Detroit, Chicago, St. Louis, Washington, Cincinnati, Pittsburgh, Cleveland, Buffalo, New Brunswick (N.J.), Norfolk (Va.), Beckley (W. Va.), Bristol (Va.), Toledo (O.), and Gary (Ind.). Beckley and Bristol were included as major coal centers.

The massive report divided the region into 184 zones, replete with maps showing points recommended for continued rail service and the mileage rated as "potentially excess."

Brinegar asserted, however, that "a recommendation against inclusion of mileage (from any zone) in the final system plan does not necessarily preclude continuation of that service." He said that "such mileage may be reinstated for economic or other reasons as the planning process progresses," or this mileage "may be eligible for state subsidized service as provided by the Act."

General chairmen to meet May 8-10

President C. J. Chamberlain has called a meeting of all General Chairmen of the Brotherhood of Railroad Signalmen on May 8, 9 and 10, 1974, at the Arlington Park Towers, Arlington Heights, Illinois.

The meeting is being called to bring the General Chairmen up to date on matters being handled by Grand Lodge.

The following speakers will appear on the program to give reports and information in connection with their activities as they affect our Brotherhood:

Maywood Boggs, Special Assistant—OSHA; R. C. Howard, Secretary-Treasurer—LABOR Newspaper; Patrick L. Lavery, Senior Supervisor—The Travelers Insurance Company; Neil Speirs, Labor Member—Railroad Retirement Board; Henri Rush, Deputy Administrator—Dept. of Transportation, FRA; D. W. Bennett, Chief Counsel—Dept. of Transportation, FRA; Mac E. Rogers, Associate Administrator—Office of Safety, Dept. of Transportation, FRA; P. J. McCue, Executive Director—Association of American Railroads; Hoy A. Richards; Research Economist—Rail Systems Programs, Texas A&M University; K. McMurray, Chairman—National Mediation Board; B. Edwin Ridge, President—Provident Life and Accident Insurance Company; Attorneys M. Henslee, E. Rerat, A. Rives, C. Hildebrand and L. Hastings—Federal Employers' Liability Act.

People

SEABOARD COAST LINE: **Oliver Pearson,** supervisor communications & signals, at Nahunta, GA has retired. **T. M. Burns,** office engineer communications & signals, Jacksonville, FL has retired. Appointments in the communications & signals department at Jacksonville include the following: **C. M. Acker** to administrative assistant; **J. W. Crawley** to office manager; **C. K. Davis** to assistant office engineer; **T. L. Kennedy** to assistant office engineer; **J. A. Kvartko** to assistant office engineer; and **P. R. Snyder** to office engineer.

SOO LINE: **Milton J. Terrell** appointed director of safety with headquarters at Minneapolis, MN.

SOUTHERN: **Howard L. Ballman,** supervisor communications & signals, Columbia, SC, transferred to Princeton, IN. **Roy H. Collier,** assistant supervisor communications & signals, deButts yard, TN, appointed supervisor communications & signals at Columbia, SC. **Paul L. Kaylor, Jr.,** appointed detector analyst at Atlanta, GA. **Robert T. Mitchell** application engineer communications & signals at Atlanta appointed general supervisor communications & signals at Hattiesburg, MS. **Thomas B. Hammett, Sr.,** signal & electrical supervisor, Spartanburg, SC, retired July 17. **Floyd Patrick, Jr.,** appointed communications & signals supervisor, Spartanburg, SC.

UNION SWITCH & SIGNAL DIVISION, WABCO: **Glenn Stinson,** manager of research & engineering appointed vice-president & general manager, succeeding **C. B.** Ramsdell elected vice-president and group executive WABCO Transportation Systems Group. **Donald D. Huffman,** manager railroad and industrial control, appointed manager, engineering. **Andrew J. Carey,** section manager railroad and industrial control, appointed manager, systems engineering. **Charles W. Wall,** supervising engineer, railroad and industrial control, appointed manager railroad and industrial control.

WESTERN PACIFIC: **John W. Gavey,** highway crossing protection engineer, has retired.

Local Lodge News

Aeriel Local No. 56 Long Island held a retirement dinner Dec. 22, 1973 at Coral House, Baldwin, LI. Retirees (left to right) are: Mr. and Mrs. **M. Strynkowski** (he was foreman communications); Mrs. and Mr. **G. Gilmore** (former signal foreman); and Mrs. and Mr. **R. Francis** (former signal technician). BofRS emblem in background was painted by Brother **Tom Devine's** wife.

Local 169 helps a Brother in need

Brother **N. J. Bowers** and family wish to thank all of his Brothers who so graciously contributed to his appeal for financial assistance that was printed in the May 1973 issue of THE SIGNALMAN's JOURNAL. "I would like to announce that we received a total of $163 to help Brother Bowers in his time of need," reports **William P. Bath,** recording and financial secretary, Local 169, Norfolk & Western (former Nickel Plate—Cloverleaf division).

SCL local No. 16 met in Jacksonville

On Jan. 12, 1974 Local 16 Seaboard Coast Line and Jacksonville Terminal met in Jacksonville, FL. **J. C. Baldwin,** chief signalman, appointed **Larry Norris** inside semaphore and **S. R. Jenkins,** chaplain, who opened the meeting with a prayer. Six officers, 22 members and 2 guests were present. Attorney **Larry Hastings** described the rights of workers under the Federal Empoyers' Liability Act.

Applications for 15 new members were ruled on by Brothers **J. W. Powers, R. R. West** and **D. Popham** and accepted into the Order. Brothers **D. Popham, W. E. Turner, H. A. Melton, W. F. Lee, D. A. Gibbs, C. M. Edwards** and **D. J. Berryhill** received the Obligation.

Brother **A. L. Platt** said he believes that signal gang members should receive compensation for traveling to and from work in their cars because they do not have train service. Also, he mentioned that gasoline is hard to find. **G. G. Gross,** general chairman, said that he has been trying to obtain compensation for gang members. Some of the gangs will be able to work straight through for a half and then go home. He said that BofRS wants to help them obtain payment for travel time. Brother Powers suggested that 10 circles should be drawn on a map of the SCL system and a gang works in each circled territory. The men would bid on the gang working nearest their homes. Brother Gross said SCL management does not want this. He had one conference with the Carrier on Jan. 22 and will continue to work on this problem.

Brother Gross also reported that **R. D. Liggett,** chief engineer, signals and communications, had called him to ask if the railroad could contract for six more crossing signal installations, and Gross told him "No." A discussion was held on contract work.

Brother **Stafford** said the Company should give a maintainer a voucher to pay his expenses when SCL sends him off his job to work for two or three days.

Brother **H. L. Swaggerty** said the Carrier is putting on a new signal gang No. 12. Brother Gross asked: "What do we have to bargain with if the Company is putting on new jobs?" He said that "If we don't let them contract some crossing signals, the State of Florida will pass legislation to contract the work." Brother **S. S. Stone, Jr.,** said he is against contract work, but if it is to be allowed then contract work should be at a specific location and with a time limit on it. Brother West wanted to know if this contract work was to be permanent or of a temporary nature.

A discussion was held on Jacksonville Terminal Co. employees. Brother Gross said that they are trying to work something out, but he told the Company that he could not dovetail JT employees into the SCL seniority roster.

Also, a discussion was held on how maintainers are to be relieved this year when they go on vacation.

Best wishes were extended to sick Brothers **A. Jerriel, A. J. Westberry, C. R. Weathers, B. S. McGirt, J. M. Land, W. H. Robinson, J. B. Dismuke, L. S. Smith, James L. Braddock, Joseph L. Hardee** and **W. B. Alexander.** Also, deepest sympathy is expressed to the family of deceased Brother **W. L. Harris.**

On Nov. 10, 1973, Local No. 16 met at Savannah, GA. J. C. Baldwin, chief signalman, appointed Brothers **C. A. Stone** inside semaphore, and **Guy McGriff,** chaplain, who opened the meeting with a prayer. Ten officers, 5 members and **N. D. Ford, Jr.,** retired member were present. Applications of 13 new members were ruled on by Brothers **T. L. McCallister, P. L. Ellis, Jr.,** and **A. E. Joyner,** and accepted into the Order.

G. G. Gross, general chairman, said that if the dues check-off forms are signed, SCL will deduct the second quarter dues from the pay checks, but that members will have to pay first quarter dues themselves. Also, he said he is touring

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LODGE NEWS

(Continued)

the system to explain the dues check-off and obtain members signatures on the proper forms.

Brother Baldwin said he was going to a railroad labor Federal Safety Law seminar and if the Local does not want to pay for his expenses, he will. Brother **T. P. Shearing** said that a retirement discussion meeting was held in Jacksonville, but if he had attended he would have lost a day's pay. He said some way should be found to take care of paying expenses for meetings. However, Brother **A. E. Joyner** said he thought the matter would get out of hand if the Local paid the expenses.

A discussion was held regarding the wearing of hard hats. Some thought it was a fine idea when needed, but others said they never wear a hat of any kind. One member said "after you wear a hard hat a little while you will get used to it." **M. B. Frye,** BofRS, vice-president, said that the wearing of safety hats (or hard hats) is required by Federal Safety laws. In order to file a claim under these safety laws, one must show negligence on the part of the Company. Brother Frye also reported on Grand Lodge activities.

Brother Gross reported that he had settled claims for Brothers **E. G. McGriff, J. T. Mitchum, W. H. Robinson** and **C. M. James.**

Best wishes are extended to the sick: Brothers **P. E. Hughes, Jr., C. G. Hall, A. Jerriel, A. J. Westberry, C. R. Weathers, B. S. McGirt, J. M. Land, W. H. Robinson, J. B. Dismuke, L. S. Smith, James L. Braddock** and **Joseph L. Hardee.**

On Sept. 8, 1973 Local 16 met at Hamlet, NC. Chief Signalman **J. C. Baldwin** appointed **V. E. Smith** inside semaphore and **B. S. McGirt** chaplain. Four officers and 11 members were present. Applications of new members were ruled on by Brothers V. E. Smith, **W. B. Alexander** and **H. L. McCrimmon,** and were accepted into the Order.

G. G. Gross, general chairman, and **G. A. Harrington,** secretary, BofRS, Board of Trustees, reported on the convention at New Orleans. Brother Harrington reported that Grand Lodge will pay for subscriptions for members to LABOR newspaper.

A discussion was held on one man going out at night alone. Brother Gross said that **R. D. Liggett,** chief engineer signals and communications, SCL, said that if a man had to go out at night alone to a dangerous place he should get a man from the property protection department to accompany him. If such a man was not available, then another signalman should go with the original signalman called.

Brother **V. T. Smith** asked what part of a signal bridge should be worked on by a signal maintainer and what part by a bridge gang? Also, he said division of work was also involved in applying graphite to switches. Brother Gross said he was working on these problems.

Brother Harrington said that delegates to the convention wanted to know the members feelings about contracting out work because many railroads do not have this practice. Brother **J. T. Mitchum** said he thinks "we had better be careful when we contract work because this might hurt us some years later."

Best wishes are extended to sick Brothers **P. E. Hughes, Jr., C. G. Hall, A. R. Jarriel, A. J. Westberry, C. R. Weathers, B. S. McGirt, J. M. Land, W. H. Robinson, J. B. Dismuke, T. C. Lawrence** and **Bob McKenzie.** Deepest sympathy is sent to the family of deceased Brother **Charlie Brantley.**

T. E. Maness, Jr.
Secretary-Treasurer

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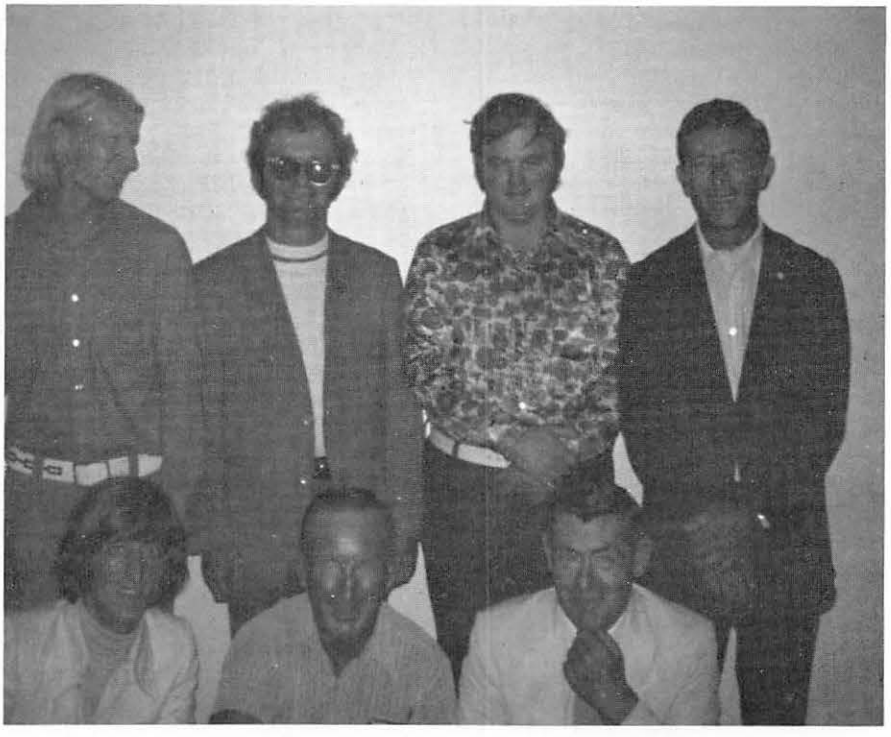

Florida East Coast local No. 66 meets in Ft. Pierce, FL. Standing, left to right, are **W. A. Coats, Mark McHue, Frank Dyal** and **Y. L. Jessup.** In front, left to right, are **Paolo DeSanti, James Whittaker** and **Harry MacDonald.**

General Committee News

General Committee Penn Central (former NYC Lines East) met at Utica, NY in December 1973. Standing, left to right, are **Charles Ahlert, Jr.**, chairman local 160; **R. L. Glenning**, vice-chairman, general committee PC; **J. W. Ryan**, chairman local 177; **F. C. Cadden**, chairman local 22; and **R. C. Carlisle**, chairman local 93. Seated, left to right, are **R. S. Phillips**, chairman local 213; **H. M. Friedel**, general treasurer; **C. K. Kiernan**, general chairman; and **R. J. Szprygada**, general secretary.

LV general committee elects new officers

At a Lehigh Valley general committee meeting in Allentown, PA on November 17, 1973, **Carl T. Heitzman**, chairman of Rainbow Local No. 57, was elected general chairman succeeding **William Leindecker**, who resigned because of sickness. **G. J. Morrissey**, chairman Wyoming Local No. 59, was elected vice-general chairman succeeding **P. R. Behney**, who retired. **James E. Lightcap** is financial secretary of the LV general committee.

General Committee PC met in Utica, NY

With **C. K. Kiernan**, general chairman, presiding, the general committee Penn Central (former New York Central Lines East), met Oct. 25 and 26 in Utica, NY. All members were present. Welcomed was **F. C. Cadden**, new chairman for local 22, succeeding Brother **A. Ganson**, retired. Brother Cadden was formerly in the construction forces, NYC Lines East.

Brother **H. M. Freidel**, general treasurer, announced that he would be retiring on Dec. 31, 1973. Discussion was held on the feasibility of electing another general treasurer or combining it with the general secretary's position. Decision was made for the combination position, and Brother **R. J. Szprygada** is general secretary-treasurer.

General discussion of mutual problems was held and local chairmen freely participated, bringing their problems to the attention of the general committee. **Brother J. W. Walsh**, newly elected vice-president, attended and spoke on several subjects of mutual interest. Discussion was held on the actions taken at the July convention and the results thereof.

Menk has kinds words for rail labor

Speaking to the Chicago Executives Club on Jan. 25, Louis W. Menk, chairman, Burlington Northern Inc., said that rail labor played a key role in developing a solution to the Northeast rail crisis. Specifically, he said:

"Some of the most severe criticism has been directed at that section of the bill that calls for up to $250 million in compensation to workers whose careers will be interrupted in the process of consolidating seven bankrupt railroads. But I say that those who find fault with this provision are ignoring two realities—

"One, the nation was not going to get a solution in the Northeast without the cooperation of rail labor.

"Two, there would have been ice hockey played in hell before organized labor would turn its back on the several thousand workers and their families who could be made economic orphans by consolidation. Government transportation policies since World War II were principally to blame for the disasters in the Northeast and rail labor was determined to be included in the reparations package."

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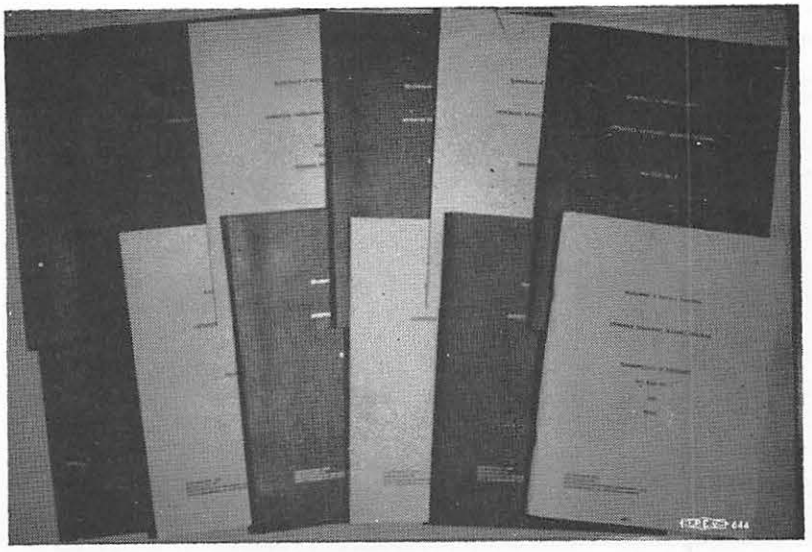

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Text No. 7 is a comprehensive digest of information related to the TCS control machine; the generation and transmission of codes; chain repeat action of coding units; and indication code preference.

Text No. 8 covers electric locked switches; and maintenance procedures for detector devices, coded track circuits, carrier equipment, and diesel generators.

Mr. R. T. Bates, Secretary-Treasurer
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News from Canada

CANADIAN NATIONAL: **Carroll L. Horsman,** member of local lodge W. J. Gillis No. 167 retired May 31, 1973.

St. Charles No. 187 holds January meeting

Local 187 Canadian National (relay shop in Montreal) held its regular meeting on Jan. 25, 1974 in the Queens Hotel. Eight members were present. Vice-Chief Signalman **L. Leblanc** presided, and Chaplain **Bevilaqua** read the blessing. BofRS Vice-President **John E. Platt** explained the distribution of dues increase. Local Chairman **J. McCormick** read a letter he had sent to CN management about the Local's request to have the training program examinations in French for those members who so desire.

Nominations for the position of Co-Op Chairman followed, but because no one present was willing to accept the position, Brother **T. Carriere** agreed to continue until the March meeting.

Brother **S. Prince,** local secretary, gave the sick committee report which showed that benefits were provided to seven members in the last quarter of 1973. Brothers **O'Reilly** and **Kai** are sick.

Brother J. McCormick reported that the signal supervisor told him that if a majority of the members agree to finishing work at 4 p.m., **P. A. Doyle,** shop superintendent will bring the subject to higher management. Brother McCormick will poll the shop members on this change in working hours. The motion to so direct Brother McCormick was made by S. Prince, seconded by T. Carriere and carried by voice vote.

Brother Prince asked the members to authorize the overhaul of Local's typewriters. Motion by T. Carriere, seconded by **A. Hawkly** was carried to overhaul Prince and McCormick typewriters to put them in good condition.

Brother Prince asked if an inquiry would be made into why no one from the signal shop has been accepted for Section 11 (electronics) training. He said "this is the second time we have been asked to apply, but have been passed over." Brother McCormick said he will send a letter to the training program supervisor asking for an explanation.

Brother McCormick also described the proper procedures to follow for submitting a grievance to the Company through the Local. Brothers McCormick and Platt described the highlights of the new contract, and a discussion followed.

On Nov. 16, 1973, a regular meeting of Local 187 was held at the Queens Hotel in Montreal. Chief Signalman **D. Wallace** presided and Chaplain Bevilaqua read the blessing.

Chief Wallace called for nominations for one member of the board of trustees to fill a can vacancy due to the resignation of **S. Prince. A. Wallace** was nominated by **L. Leblanc** and **A. Carriere** was nominated by **V. Bevilaqua.** A. Carriere declined; A. Wallace was elected by acclamation.

J. McCormick, local chairman, read a letter he sent to the CN pertaining to a grievance about work being done out of the shop on aluminum cantilevers, masts, etc., as it affects the Job Security Clause. CN replied that no shop employe had been affected. Discussion followed. Also Brother McCormick read a letter from **P. A. Doyle,** shop superintendent requesting information on the case of **R. Gilpin.** Brother McCormick told members that he had informed Mr. Doyle that the information was in the hands of the general chairman.

Chief Wallace read a letter of resignation from Co-Op representative **A. J. Carriere.** Brother McCormick suggested that Brother Carriere keep the job until the next meeting when an election could be held. All agreed to this.

The Sick Committee reported that Brothers **J. P. Henry, H. Wells** and **F. Bergeron** received gifts from the Local.

Chief Wallace reported that his claim with the Sun Life Insurance Co. for unpaid benefits during the strike had now been paid. Assumption was voiced that this would apply to the other brothers affected in the same way.

Brother McCormick read several letters from Grand Lodge providing general information of interest to the members. Also, he answered Brother **E. Sokolowski's** questions on why a general strike was called and the matter of strike pay.

J. McCormick read letters concerning the increase in Grand Lodge per capita tax and the proposed distribution of a proposed $3.00 monthly dues increase distributed between Grand Lodge, the General Committee and the Local. After considerable discussion, a motion made by S. Prince, seconded by **A. Hawkly,** was carried that the General Committee be informed that the proposed $1.41 increase be used solely for future Grand Lodge per capita tax increases, and that no further assessments be made until the $1.41 is used up.

Lever A. Carriere reported that the meeting room rate would be increased to $25 and suggested that the Laurentian Hotel be selected as a meeting place at the same rate. However a motion to do was defeated, and the meeting place was left to the Lever's discretion.

A motion by E. Sokolowski, seconded by **R. Porter** that future back time checques be calculated separately as to deductions was carried.

Over 100 honour Reynolds on retirement in Barrie

On June 16, 1973 about 130 friends, relatives, Brothers and fellow employees gathered at the Continental Inn, Barrie, Ont., to honour **Bruce** and **Margaret Reynolds** and to wish them both many happy years of retirement.

Brother Bruce Reynolds of Northland National No. 204, retired after 33 years of active duty on the Canadian National. Brother Reynolds was local chairman of Local 204 from its inception in 1951 until 1972. He was a very active local chairman and spent a great deal of time on the CN Co-op Movement on the Great Lakes region. Also, he served for 12 years on the Canadian National general grievance committee as a trustee and assistant general chairman, CN eastern region.

On behalf of CN Great Lakes management, **G. R. Allen** signal supervisor at London, Ont., presented Brother Reynolds with a set of Spaulding Woods. According to Marge, Bruce is P U T T I N G them to good use. Brother **J. R. Dickson,** local chairman east, presented

(Please turn page)

CANADIAN NEWS

(Continued)

Brother Reynolds with a wallet containing the donations received from his fellow employees. Brother G. T. Turner, local chairman west, presented him with a unique gift from Local 204—an engraved desk set, centered by a scale working model of a train order signal. This gift was the work of Brother R. Matte, signal maintainer at Mt. Albert, Ont.

Special guest BofRS President Charles J. Chamberlain, addressed the gathering and wished Brother Reynolds all the best for the years to come. Other guests included Brother Reynolds' family; J. E. Platt, BofRS, vice-president; R. R. Mitchell, BofRS grand lodge representative; P. G. O'Malley, CN, regional engineer of signals; G. E. Casey, regional supervisor of signals; and many others.

GTW official says DOT rail plan objective

John H. Burdakin, executive vice-president of the Grand Trunk Western, says the Department of Transportation's extensive recommendations effecting 61,184 miles of railroad tracks in a 17-state area of the Northeast and Midwest is "clearly bounded by checks and balances which protect consumer interest."

"Although the DOT study indicates 37% of the trackage in Michigan is minimally used and potential for abandonment consideration," Burdakin said, "97% of present traffic would be retained. Important to remember" he continued, "is that the DOT's complex recommendations must travel through five major steps before final Congressional approval scheduled for March 1975. Obviously, it is premature for Grand Trunk or any railroad to make comments on specific areas of track, or possible effects until each railroad has had time to make its own assessment and input into this giant package of proposals.

"In our judgment," Burdakin continued, "the DOT study is an objective and honest approach to the railroad financial crisis in the Northeastern part of the country. Because these proposals extend over a 17-state area, 61,184 miles of trackage, and involve extensive railroad holdings, every railroad is obligated to make an in-depth study of these far-reaching recommendations." There will not be arbitrary cuts of freight rails in Michigan. There will be ample opportunity for railroads as well as consumers to voice approvals or disapprovals.

"At Grand Trunk, we plan to cooperate to the fullest extent with all levels of government, the ICC, and the newly created U.S. Railway Association. We will do so because we are confident the legislation is necessary to prevent nationalization, to permit improvement in the railroad industry in the Northeast, and to adequately protect consumers throughout the country."

Obituaries

M. J. Haag, retired member of Local 212, Penn Central (New York Central, Lines West) passed away recently. He was 77.

Brother Haag retired March 31, 1960 after completing 41 years of service with the New York Central. At the time of his retirement he was employed as a signal inspector at Springfield, OH.

The officers and members of Local 212 extend their deepest sympathy to the members of his family.

John E. Holmes, member of W. J. Gillis Local 167, Canadian National, passed away Oct. 17, 1973. He had been a resident of Tourville L'Islet, Quebec.

George O. Hout, retired member of Local 94, Baltimore and Ohio Lines West, passed away September 29, 1973. He was 71.

He retired in June of 1962 after completing 42 years of service with the B&O. At the time of his retirement he was employed as a signal inspector at Flora, IL.

Brother Hout was an active member of Local 94 and served as an officer.

He was buried with Masonic rites at Flora.

Surviving are his wife, Marion; one son, Darrell E. of Henderson, KY; three daughters: Peggy Kuder, Henderson; Ernestine Eskew, Flora; Jeannine DeLaney, Wichita Falls, TX; and ten grandchildren, to whom the officers and members of Local 94 extend their deepest sympathy.

Merle L. Johnson, member of Local 220, Milwaukee Road, passed away the middle of October, 1973.

At the time of his death Brother Johnson was employed as a signal maintainer.

He is survived by his wife, Frances, and three children, residing at Box 18, Groton, SD 57445.

The officers and members of Local 220 extend their deepest sympathy to his family.

J. B. Kemp, member of Frisco Local 129, passed away May 24, 1973. He was a resident of Joplin, MO.

Donald Leach, member of Winton Local 94, Baltimore & Ohio Lines West, and Dayton Union, passed away Sept. 9, 1973. Brother Leach, 58, was a signal maintainer, and resided at Blanchester, OH.

Gerald C. Lewis, member of Miller-Griffith Local 49, passed away in July, 1973. Brother Lewis was a signal maintainer on the Southern at Oneida, TN.

William J. May, member Gateway Local 135, Chicago and Cincinnati Divisions, Chesapeake & Ohio, passed away Sept. 29, 1973. He had been a resident of Denver, IN.

Calvin L. Morris, member Local 16, Seaboard Coast Line and Jacksonville Terminal, passed away Feb. 9, 1973. Brother Morris was a resident of Savannah, GA.

Charles Noll, retired member of Local 102, Penn Central, (former Pennsylvania) passed away November 13, 1973. He was 71.

At the time of his retirement Brother Noll was employed as a signal foreman on the New York Divison at Newark, NJ. He retired July 1, 1966 after completing over 46 years of service with the Pennsylvania.

The officers and members of Local 102 extend their deepest sympathy to his wife, Eleanor, and the members of his family.

M. C. Vearrier, member Roseburg Local 152, Southern Pacific, passed away July 28, 1973. Brother Vearrier was a resident of Oakridge, OR.

Determine your rights under FELA

Members who are injured on the job and the dependents of those members who have been killed or have died as the result of such injuries should by all means ascertain their rights and benefits under the Federal Employers' Liability Act before attempting any settlement with the railroad.

Below is a list of attorneys who, on the basis of information made available to us, are competent to give full information and assistance to those in need of it.

This list is compiled and maintained on the strength of information furnished us by both attorneys and members. The accuracy of the list that we will publish from time to time depends entirely on the information furnished us. Therefore, everyone concerned is urged to keep us informed regarding cases handled, nature of the case, terms of the settlement, commendations, criticisms, etc.

This information should be forwarded to C. J. Chamberlain, president, Brotherhood of Railroad Signalmen, 601 West Golf Road, Mt. Prospect, IL 60056.

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Spokane to have Expo '74

By Robert Hawkins

Spokane, a metropolitan area with approximately a quarter-million people, a city plunked down in the middle of a mapful of staggering vacationland scenery, is getting ready to hold America's first World Exposition on the Environment. Expo '74, a world's fair dedicated to ecology and outdoor recreation, has been officially approved by the Bureau of International Expositions in Paris and by President Richard M. Nixon on behalf of the U.S. Government. It is slated to open for a six-month run in May 1974. But it never would have gotten off the drawing boards if it hadn't been for the railroads.

For many decades, the Spokane River has been the center of railroad activity and consequent industrial development. It began back in 1879, when Northern Pacific began laying its first survey lines through Spokane. In 1896, the Great Northern Railway came in and, as one of its first acts, promptly built four bridges over the Spokane River. By now, Northern Pacific was strong in the region and by 1910 had 14 lines of track, including a main-track double thoroughfare, spread out like flattened spaghetti along the south side of town.

Two years later, Union Pacific entered Spokane under a joint agreement between two other tenants, the Chicago, Milwaukee and St. Paul Railway and Spokane International. Almost immediately, Union Pacific began work on two more bridges over the Spokane River and a large-scale terminal big enough to handle the traffic of all the railroads.

RIVER DISAPPEARS

The river began to disappear. Not from any ecological disaster, but from the mushrooming of hastily built warehouses, thoughtless industrial additions and bridges. By 1915, Spokane had 29 bridges spanning the river within the city limits.

Track was everywhere. In 1911, the Union Pacific began a massive $2.5 million grade separation project that would erect a 12 to 14 foot elevated track the entire length of the railroad's right-of-way through the city. The spindly looking trestles emphasized the dismal look of the area, and eventually blight and deterioration began to spread into the core of the city. A once sparkling river and tumbling, effervescent falls was now seemingly lost forever.

Then, a few years ago, City of Spokane officials developed a long-term plan for reclamation and rehabilitation of the blighted but once-lovely area. Civic leaders began discussions with the railroads about the possibility of removing their tracks from Havermale, the larger island in the middle of the river. The railroads listened and were receptive. Finally, in the spring of 1969, a major breakthrough for the city's plans for downtown riverfront revitalization occurred: All railroads agreed to support the city's proposal. Still, despite the support of the plan by the railroads, the city was faced with the problem of how to acquire the valuable land the railroads held.

About this time, Spokane historians noted that the city's centennial year was just about three years away. Discussions for appropriate events led to planning sessions. A Los Angeles research firm, Economic Research Associates, was consulted, and, based in part on ERA recommendations, the centennial celebration grew into a six-month International Exposition — a real World's Fair. It was decided that the entire downtown riverfront section of the central city area, along with Havermale and the smaller Cannon Island, would be a perfect site for the event. And Expo '74 was born.

Following the initial planning and development stage, Expo '74's first major hurdle was cleared when Governor Daniel J. Evans of Washington State signed into law a package of three bills guaranteeing state support of up to $7.5 million to build a State pavilion at the Exposition.

But by far, the major problem facing Expo '74 was solved on August 19, 1971, by the railroads themselves. Burlington Northern, Union Pacific and the Milwaukee Road, the three lines in the proposed site area, not only agreed to relocate their tracks and other facilities in this area, they also gave to the City of Spokane a total of 21.4 acres of land for Expo '74. A nominal lease agreement was then set up between Union Pacific and Expo for an additional 14.6 acres to be used during the international Exposition.

CLOCKTOWER REMAINS

That was over a year ago. Today, demolition has begun on a series of the weatherbeaten old railroad structures. On Havermale Island, the old Great Northern railroad station and miles of associated tracks are being demolished or removed. The venerable old Great Northern (Burlington Northern) clock tower, according to present plans, will be retained as a landmark—symbol of the Exposition, with a historical interpretative center to be developed at its base.

On the south river bank, the elevated tracks and trestles of the Union Pacific railroad, the old U.P. station, related warehouses and miles more of trackage are being removed or razed. Bridge after bridge is being removed. Millions of dollars worth of equipment, facilities and real estate are simply being written off. Seemingly a heck of a way to run a railroad, this three-company maneuver is earning unexpected benefits. By clearing the tracks for Expo '74, the railroads are gaining recognition, goodwill and closer appreciation of their own problems from not only Washington State but the nation at large.

And Expo '74 is turning on full throttle.

EXPOSITION IN CITY

The 100-acre Exposition site, right in the middle of the city, is opening up and blossoming out into what will become one of the loveliest of World's Fairs; one which will provide a postfair legacy of environment beauty and culture. The theme of the $70 million Exposition, "How Man Can Live, Work and Play in Harmony with His Environment," will be carried out in a dazzling array of exhibits from many nations, industries and environmentalists.

President Nixon and members of Congress have given their stamp of approval to an $11.5 million bill to construct a prestigious, ultra-modern U.S. Pavilion. Construction has begun on the Washington State Pavilion, which, with the U.S. Pavilion, will become a permanent facility for the city.

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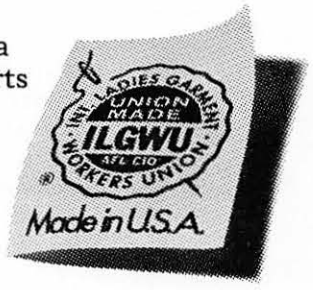

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Signalman's Worksheet

DC Track Circuits (Cont'd)

Looking at curve A in Figure 105, we see that as we move from a shunt of zero resistance across the rails to a leakage of 0.25 ohm, the relay current increases to 100 mills, pickup of this relay. In other words, this circuit will not operate unless the ballast resistance is 0.25 ohm or more. Now, moving backward along curve A toward zero resistance, we find the current of this 50 percent release relay below 50 mills at 0.1 ohm. This is well above the 0.06-ohm shunt specified by the Signal Section of the Association of American Railroads to ensure the proper sensitivity of track circuit shunting.

This picture is varied by many things: percent release of the track relay, relay resistance change with temperature, "off" and "on" charge voltage of the track battery, type of battery, rail resistance changes with temperature, etc.

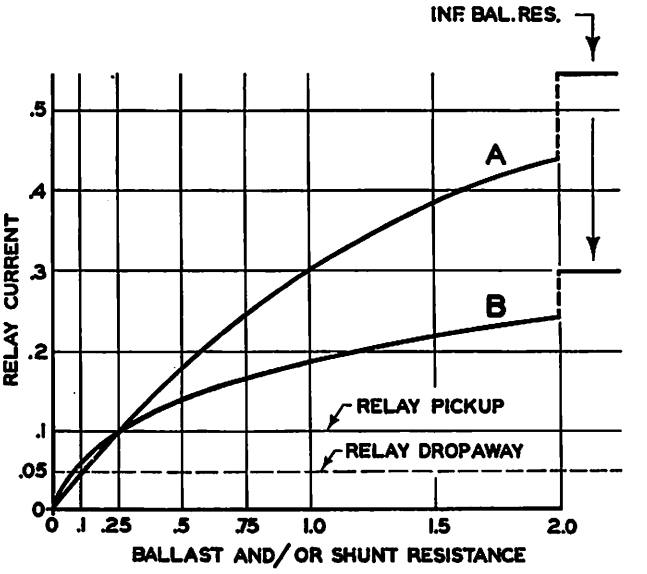

Fig. 105: Relay current variation with varying resistance across the rails.

Circuit Adjustment

Obviously, however, the end to be obtained is not to get the best shunt with the highest allowable resistance but to get the best shunt when a train enters the track circuit.

Curve A shows the conditions when we have a 4-ohm relay without added relay series resistance. Curve B shows the conditions when we add 4 ohms of series resistance to our 4-ohm relay. Incidentally, we have to reduce the limiting resistance in the track battery feed to do this, otherwise our relay will not pick up on the given 0.25-ohm minimum ballast.

In comparing the two curves we note:

1. Curve A shows relay current below dropaway at 0.1 ohm, while curve B is still well above dropaway. In fact, on curve B the dropaway point is barely reached at the A.A.R. 0.06-ohm shunt. The first reaction is that curve B is not as good as curve A, that our shunt resistance must be lower. Note now, for future reference, that when we added the 4 ohms in series with the 4-ohm relay, we doubled the interrail voltage at the release value of the relay—a point to remember when we consider ionization voltage as will be explained under "Train Shunt."
2. At infinity ballast resistance, the relay current in curve B rises to only 0.3 ampere as against 0.55 ampere for curve A. This lower current at dry ballast gives faster shunting as we shall explain under "Relay Operation."

Percent Release of Track Relay

Suppose we substitute a track relay with a percent release approaching 100, that is, we move the "relay dropaway" line up close to the "relay pickup" line. Now our circuit will release with a quite high resistance shunt, just a little less than 0.25 ohm. The answer to a signalman's prayer? Not quite. It is possible to build a very high release relay but it requires special adjustments, special core material. Such a high percent release relay will not maintain its operating values consistently over a period of years. We expect a relay to stay in service for many, many years with little or no attention. We have seen, for example, annual relay test report cards that have indicated no change at all for 15 years. By working to a 65 percent release, we can insure maximum stability in service.

Another factor affecting the choice of relay release percentage is what we might call the sub-low minimum ballast condition of a track circuit. This condition usually occurs at the start of a shower after a long dry period. The ballast particles are coated with fine dust. At the first wetting, the dust particles are merged to form innumerable rail-to-rail paths of unusually low resistance. As the rain continues, this material washes away, and the rail-to-rail resistance rises again. A low percent release relay will be far more likely to remain picked up through such a sub-low ballast condition. Curves in Figure 105 show that, with a 65 percent release relay, the ballast could drop much lower than 0.25 ohm, that is to 0.150 ohm, and not cause the relay to drop away and suddenly place a signal at stop in the face of an approaching train without prior warning. If we had a high percent release relay, we should have to adjust the circuit for that much lower ballast resistance. The result would be an approach to the same resistance shunt, and no advantage would be gained.

To Be Continued

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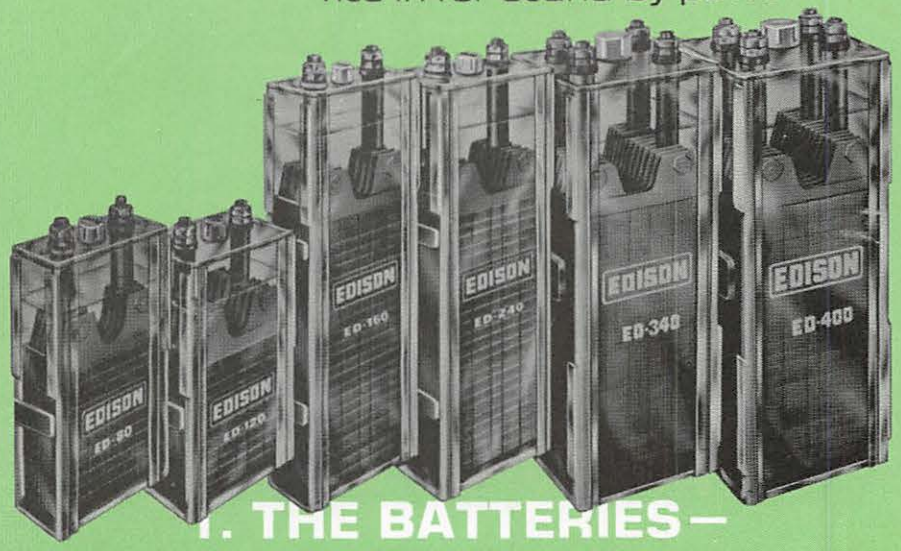

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